Wire Antennas for Ham Radio

Iulian Rosu YO3DAC / VA3IUL,

http://www.qsl.net/va3iul

Note: Dimensions of the antennas presented below are either in: feet ('), inch ("), meters (m), or centimeters (cm)

01 - Tee Antenna
02 - Half-Lamda Tee Antenna
03 - Twin-Led Marconi Antenna
04 - Swallow-Tail Antenna
05 - Random Length Radiator Wire Antenna
06 - Windom Antenna
07 - Windom Antenna - Feed with coax cable
08 - Quarter Wavelength Vertical Antenna
09 - Folded Marconi Tee Antenna
10 - Zeppelin Antenna
11 - EWE Antenna
12 - Dipole Antenna - Balun
13 - Multiband Dipole Antenna
14 - Inverted-Vee Antenna
15 - Sloping Dipole Antenna
16 - Vertical Dipole
17 - Delta Fed Dipole Antenna
18 - Bow-Tie Dipole Antenna
19 - Bow-Tie Folded Dipole Antenna for RX
20 - Multiband Tuned Doublet Antenna
21 - G5RV Antenna
22 - Wideband Dipole Antenna
23 - Wideband Dipole for Receiving
24 - Tilted Folded Dipole Antenna
25 - Right Angle Marconi Antenna
26 - Linearly Loaded Tee Antenna
27 - Reduced Size Dipole Antenna
28 - Doublet Dipole Antenna
29 - Delta Loop Antenna
30 - Half Delta Loop Antenna
31 - Collinear Franklin Antenna
32 - Four Element Broadside Antenna
33 - The Lazy-H Array Antenna
34 - Sterba Curtain Array Antenna
35 - T-L DX Antenna
36 - 1.9 MHz Full-wave Loop Antenna
37 - Multi-Band Portable Antenna
38 - Off-center-fed Full-wave Doublet Antenna
39 - Terminated Sloper Antenna
40 - Double Extended Zepp Antenna
41 - TCFTFD Dipole Antenna
42 - Vee-Sloper Antenna
43 - Rhombic Inverted-Vee Antenna
44 - Counterpoise Longwire
45 - Bisquare Loop Antenna
46 - Piggyback Antenna for 10m
47 - Vertical Sleeve Antenna for 10m
48 - Double Windom Antenna
49 - Double Windom for 9 Bands
50 - Collinear Trap Antenna
51 - Short Dipole Antenna for 40m - 80m - 160m
52 - Center Fed-Zepp Antenna for 80m - 40m
53 - All Bands Antenna
54 - All-Bands Dipole Antenna
147 - KE4PT OCEF All-Band Dipole
148 - Wire Quad Antenna for 40m
149 - Inclined Dipole Antenna for 80m, 40m
150 - Pyramidal Wire Antenna for 80m
151 - Random Wire Antenna All Bands
152 - Multiband Dipole Antenna for 80m, 40m,15m, 10m
153 - Slim Jim Wire Antenna for 4m
154 - Delta Loop for 6m
155 - Re-Configurable Antenna for 160m and 80m
156 - Very Low Frequency Inverted-L Antenna
157 - Reduced Size Half Sloper Antenna for 160m
158 - Tree-Mounted HF Antenna
159 - Multiband Vertical Antenna for 80m, 40m, 20m
160 - Marconi Antenna for 136 kHz
161 - Simple Killer Antenna for 40m
162 - Stub-Directed V Antenna for 80m
163 - KT0NY Over-and-Under DX Antenna for 20m
164 - Horizontal Loop Antennas
165 - Ribbon J-Pole for 2m
166 - Dual Band Ribbon J-Pole for 2m, 70cm
167 - Square Vertical Loop Antenna for 40m
168 - Tri-Band Quad Antenna for 20m, 15m, 10m
169 - 3D Quad Antenna for 80m, 40m, 20m, 15m, 10m
170 - Sloping Wire Antenna for 30m, 20m, 17m, 15m, 12m, 10m
171 - Broadband Dipole Antenna with Coaxial Resonator for 80m
172 - Resonant Feedline Dipole Antenna for 80m
173 - Dual-Band Loading Wire Antenna for 80m, 30m
174 - Stub Matching Antennas
175 - J-Style Vertical Wire Antenna for 10m
176 - Dual Band Vertical with Zepp Feeders for 40m, 20m
177 - RCA Double Doublet for 40m to 12m
178 - RCA Spiderweb Antenna for 40m to 6m
179 - Folded Dipole with Shorted Straps
180 - Twin-Lead Marconi Antenna for 160m, 80m
181 - Broadband Antenna Quarter-Wave Balun for 80m
182 - Three-Quarter-Wave Folded Doublet for Dual-Band
183 - Three-Quarter-Wave Folded Doublet No-Switch for Dual-Band
184 - Wideband Omni-Directional Discone Antenna
185 - Wideband Rhombic Antenna for 40m to 10m
186 - Pre-Cut Linear Array Antenna 3dB-Gain for 40m
187 - X-Array Antenna 6dB-Gain for 20m, 15m, 10m
188 - Double-Bruce Array Antenna 5dB-Gain for 20m, 10m
189 - Bi-Square Broadside Array 4dB-Gain for 20m, 15m, 10m
190 - Six-Shooter Broadside Array 7.5dB-Gain for 20m, 15m, 10m
191 - Triplex Flat-Top Beam 4.5dB-Gain for 20m, 15m, 10m
192 - Dual-Band Tilt Antenna for 20m, 10m
193 - Super Space Multiband Dipole Antenna for 80m to 10m
194 - Bi-Square Beam Antenna Gain=5.5dB for 10m
195 - Cousin of G5RV Multiband Antenna for 40m to 10m
196 - Cayman Quad Antenna for 20m
197 - Hentenna Gain=3dB with Bazooka Match for 6m
198 - X-Beam Antenna Gain=3dB for 20m

55 - Multiband Z Antenna
56 - Multiband Dipole Antenna
57 - Five-Bands No-Tuner Antenna
58 - Dualband Full-wave Loop Antenna for 80m-40m
59 - Loop Antenna for 10m
60 - Lazy Quad Antenna for 10m
61 - Tri-band Delta Loop Antenna for 80m - 40m - 30m
62 - Dual-band Loop Antenna for 30m - 40m
63 - Wire-Beam Antenna for 80m
64 - Dual-Band Sloper Antenna
65 - Inverted-V Beam Antenna for 30m
66 - ZL-Special Beam Antenna for 15m
67 - Half-Sloper Antenna for 160m
68 - Two-Bands Half Sloper for 80m - 40m
69 - Linear Loaded Sloper Antenna for 160m
70 - Super-Sloper Antenna
71 - Tower Pole as a Vertical Antenna for 80m
72 - Clothesline Antenna
73 - Curtain Zepp Antenna for 160m, 80m, 40m
74 - Collinear Array Antenna for 40m, 30m, 20m
75 - 160m Inverted Delta Loop
76 - Half Rhombic Unidirectional Vertical for 20m to 6m
77 - Capacitance Loaded Vertical Antenna for 160m
78 - Fan Dipole Antenna for 80m to 6m
79 - Wire Ground Plane Antenna
80 - Inverted Delta Loop Antenna for 160m
81 - Inverted-L for 160m
82 - 300ohm-Ribbon Dual Band Dipole
83 - Tri-Band Beam for 20m, 15m, 10m
84 - Mini-Horse Yagi Antenna
85 - Backpack J-Pole Antenna for 10m, 6m, 2m
86 - Fan-Dipole Antenna for 80m, 40m, 20m
87 - Capacity Tuned Folded Loop Antenna for 20m
88 - Indoor Loop Antenna for 80m to 30m
89 - Indoor Loop Antenna for 80m
90 - Double-Delta Antenna 80m and 40m
91 - Inductance-Loaded Shortened Dipole for 160m
92 - V-Beam Antenna for 15m
93 - Picnic Vertical Wire Antenna
94 - Laid-Back Quad Antenna for 80m
95 - Phased Loop Antenna
96 - Loop Antenna for TX for 160m
97 - Morgain-Dipole Antenna for 160m and 80m
98 - ZL-Special for 20m, 15m, 10m
99 - Biconical Antenna
100 - Directive Delta-Birdcage Antenna for 20m to 10m
101 - Dual Polarization Antenna for 80m and 40m
102 - Directive 300-ohm-Ribbon Folded Dipole for 15m
103 - Miniature Directive Antenna for 10m
104 - Biquad Antenna 12dBi-Gain for 2.4GHz
105 - Dual-Rhomboid Antenna for 435MHz to 870MHz
106 - Double-Bazooka Antenna for 80m
107 - J-Style Antenna
108 - Vertical / Horizontal / Circular Polarization Antenna
109 - Coax Inverted-L Antenna for 80m
110 - Indoor Compact Loop Antenna for 80m
111 - Helix Antenna
112 - Novice Vertical Antenna for 80m, 40m, 15m, 10m
113 - Stub-Loaded Shortened Dipole for 80m
114 - Six-Band Wire-Stub Trap Antenna for 40m-10m
115 - Multiband Half-Wave Delta-Loop Antenna
199 - Twin Delta Loop Antenna Gain=6dB for 160m, 80m, 40m
200 - Inverted-V Beam Antenna for 30m
201 - FD4 Windom Antenna for 80m, 40m, 20m, 10m
202 - Two Elements Phased Delta Loop for 40m
203 - Three Elements Wire Yagi for 10m
204 - Low Radiation Angle Full-Wave Loop Antenna for 80m
205 - Collinear Antenna Gain=3dB for 2m
206 - X-Ray Monoband Antenna Gain=6.5dBd
207 - Broadside Collinear Curtain Array for 20m
208 - Shrunk Loop Antenna for 80m, 40m
209 - λ/3 Multiband Dipole for 40m, 20m, 17m, 15m, 13m, 10m
210 - K3LR Sloper Antenna Gain=3dB for 160m
211 - Mini Folded Vertical Monopole Antenna for 160m, 80m, 40m
212 - Three Band Dipole for 80m, 40m, 20m
213 - Stub Matched Dipole Antenna
214 - Inverted-Vee Antenna with Bazooka Match
215 - Multiband Long Wire Antenna for 40m, 20m, 15m, 10m
216 - Converted Vee Antenna for 80m, 40m
217 - Swiss Quad Antenna for 20m, 15m, 10m
218 - Japanese Quad Antenna for 20m, 15m, 10m
219 - Seven-Elements Triangle Beam Antenna for 20m
220 - Log Periodic Wire Antenna for 40m
221 - Three-Elements 90-degrees Wire Beam for 20m
222 - Two-Elements Wire Beam for 20m
223 - Suitcase-Fit Dipole Antenna for 80m, 40m, 20m
224 - Multiband Coaxial Dipole for 80m, 40m
225 - Vertical Log Periodic Antenna for 80m, 40m
226 - Inverted Vertical Log Periodic Antenna for 40m
227 - Double Extended Zepp Antenna Gain=7dB for 15m
228 - Double Lazy-H Antenna G=10dB for 70cm
229 - Wire Log Periodic Antenna G=12dB for 15m, 20m
230 - Five-Elements Vertical Log Periodic for 80m, 40m, 20m
231 - Sloping Delta Loop Antenna for 40m
232 - Doublet Antenna for 160m
233 - Log Periodic Wire Beam for 40m
234 - G3LDO Wire Beam Antenna for 20m, 15m, 10m
235 - Phased Delta Loop Array for 20m
236 - Dual Band V-dipole for 80m, 40m
237 - Collinear Array 5dB-Gain for 15m
238 - Two-Band Quad Loop Antenna 80m, 40m
239 - K7CW Quad Antenna
240 - Broadband Short Dipole for 80m
241 - Off-Center Fed Dipole for 40m, 20m, 10m
242 - Broadband Sloper Antenna for 80m
243 - Two-Frequency Dipole Antenna for 80m
244 - Top Loaded Vertical Antenna for 160m
245 - Two Loop Beam Antenna for 20m, 15m
246 - Corner-Fed Delta Loop Antenna for 80m, 40m, 20m
247 - Loaded Delta Loop Antenna for 40m, 20m
248 - Compact Size Dipole for 80m
249 - JAWS 3dB Gain Antenna for 40m
250 - Inverted-V Antenna for 160m
251 - Lazy-U Antenna for 160m
252 - AF3V Compact Antenna for 160m
253 - Hot Beam Wire Antenna for 40m
254 - Sloping Delta Loop for 40m
255 - K6FD Multiband Antenna with T-tuner
256 - Dual Band Dipole Antenna for 17m, 10m
257 - Compact Travel Dipole Antenna for 10m, 15m, 20m
258 - End-Fire Antenna for 160m, 80m, 40m, 20m
259 - Four Band Loop for 40m, 20m, 15m, 10m

116 - Hybrid Vee for 20m, 17m
117 - Six-Shooter Array Antenna, Gain=7.5dB
118 - Multiband Ground-Plane Antenna for 10m, 15m, 20m
119 - Wire Superbeam Antenna for 10m, 15m, 20m
120 - Two Elements Delta-Loop Antenna
121 - Sterba Curtain Antenna
122 - Half-Wave Vertical Zepp Antenna
123 - Lazy-Loop Antenna for 40m
124 - Terminated Folded Dipole for 80m, 40m
125 - Short-Fat Antenna for 15m
126 - Cobra Antenna for 80m
127 - Log-Periodic Wire Antenna for 20m, 15m, 10m
128 - 5-Element Log-Periodic Vertical Antenna for 80m, 40m, 20m
129 - 2m Vertical Wire Antennas
130 - Earth-Mover Inverted-V Antenna for 40m
131 - Coax-Cable Collinear Antennas
132 - Double Bobtail Antenna for 20m
133 - Collinear Zepp Antenna
134 - Taylor Vee Antenna for 20m
135 - Collinear Vertical Antenna 6dB-Gain for 2m, 1.3m, 73cm
136 - Bi-Loop Antenna for 20m
137 - Wire Beam 6dBd-Gain for 10m
138 - Sloping Diamond Antenna 4dB-Gain for 40m
139 - Twisted Loop Antenna for 160m
140 - DX RX Loop Antenna for 160m
141 - Hentenna 3dB-Gain for 10m, 6m, 2m
142 - VK2AAR Wire Antenna for 20m
143 - 2-Elements Quad Antenna for 6m
144 - Hula-Loop Bidirectional 6dB-Gain Antenna for 17m
145 - Moxon Rectangle Beam for 15m-10m
146 - Double-D Beam 4dB-Gain
260 - Carolina Windom Antenna for 80 to 10m
261 - Shortened Loaded Dipole for 40m
262 - Shortened Loaded Dipole for 80m
263 - Low Radiation Angle Inverted Delta Loop for 80m
264 - Compact Dipole Antenna for 40m, 15m
265 - Vertical Delta Loop for 40m to 10m
266 - Delta Loop Antenna for 17m
267 - Bi-Square Beam Gain=3dBd for 17m
268 -Trap Dipole Antenna for 17m,13m
269 - Hanging Unipole Antenna for 160m, 80m
270 - Wideband Sloping Vee Antenna - 30m to 6m
271 - 5/8 Wavelength Antenna
272 - C-Pole Vertical Antenna
273 - Bobtail Antenna for 30m
274 - Bobtail Antenna for 40m
275 - Two Elements Vertical Loop Antenna for 40m
276 - Double Extended Zepp Antenna for 40m
277 - Reversible Moxon Flip Beam for 40m
278 - Spitwire Antenna for 40m
279 - Fork Antenna for 40m
280 - Veebeam Antenna 3dB-Gain for All Bands
281 - Vertical Moxon Antenna for 10m
282 - Half-Square Antenna for 30m
283 - Rotatable Vertical Delta Loop for 20m
284 - Mini-Horse Antenna 10dB-Gain for 40m-to-2m
285 - Compact Moxon Antenna 5dB-Gain for 40m
286 - Two Elements Sloping Delta Loop 8dB-Gain for 10m
287 - Two Elements Phased Vertical Antenna 3dB-Gain for 40m

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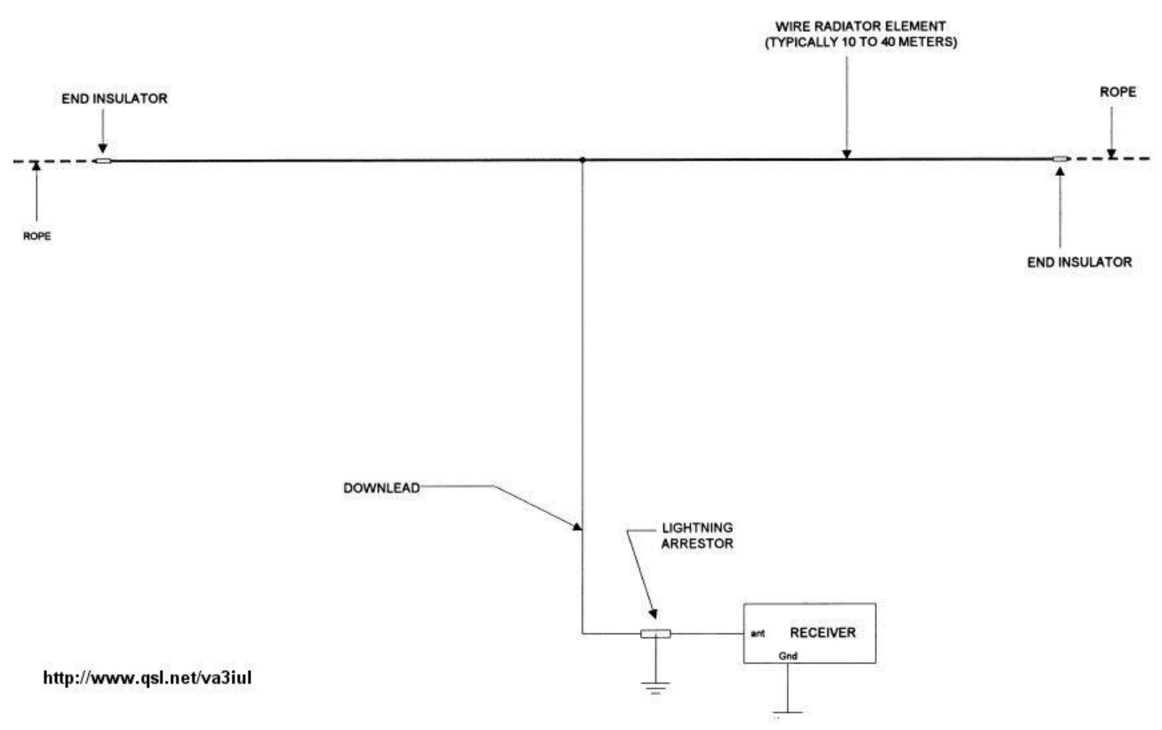
01 - Tee Antenna



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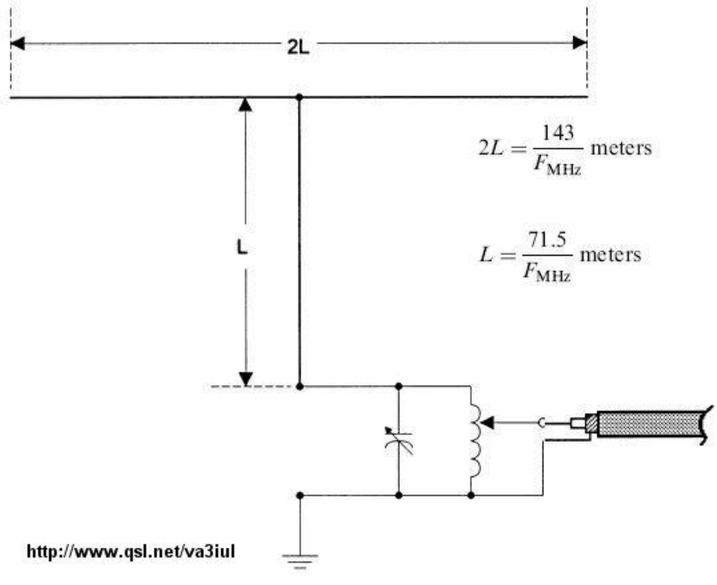
02 - Half-Lamda Tee Antenna


2L
L
$2L = \frac{143}{F_{\mathrm{MHz}}}$ meters
$L = \frac{71.5}{F_{\mathrm{MHz}}}$ meters
http://www.qsl.net/va3iul

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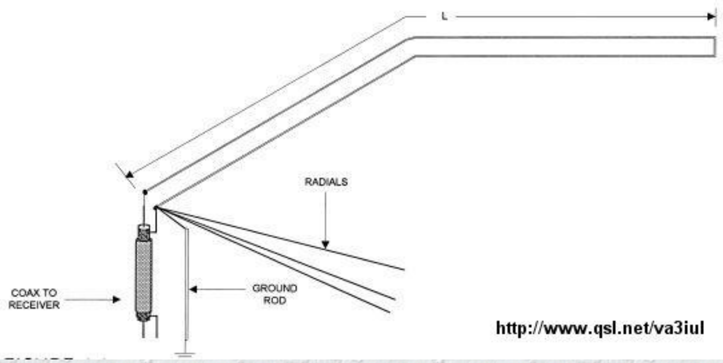
03 - Twin-Led Marconi Antenna



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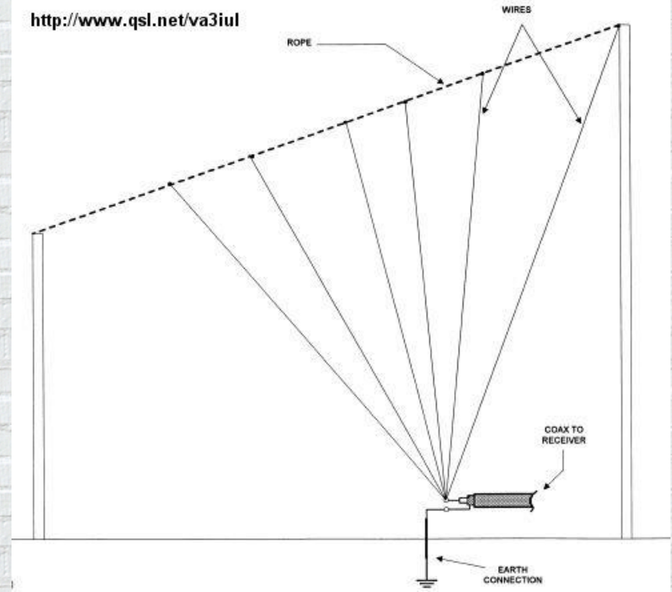
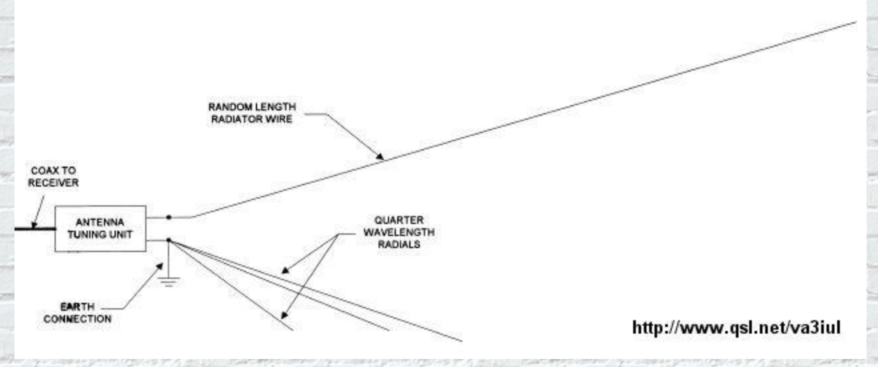
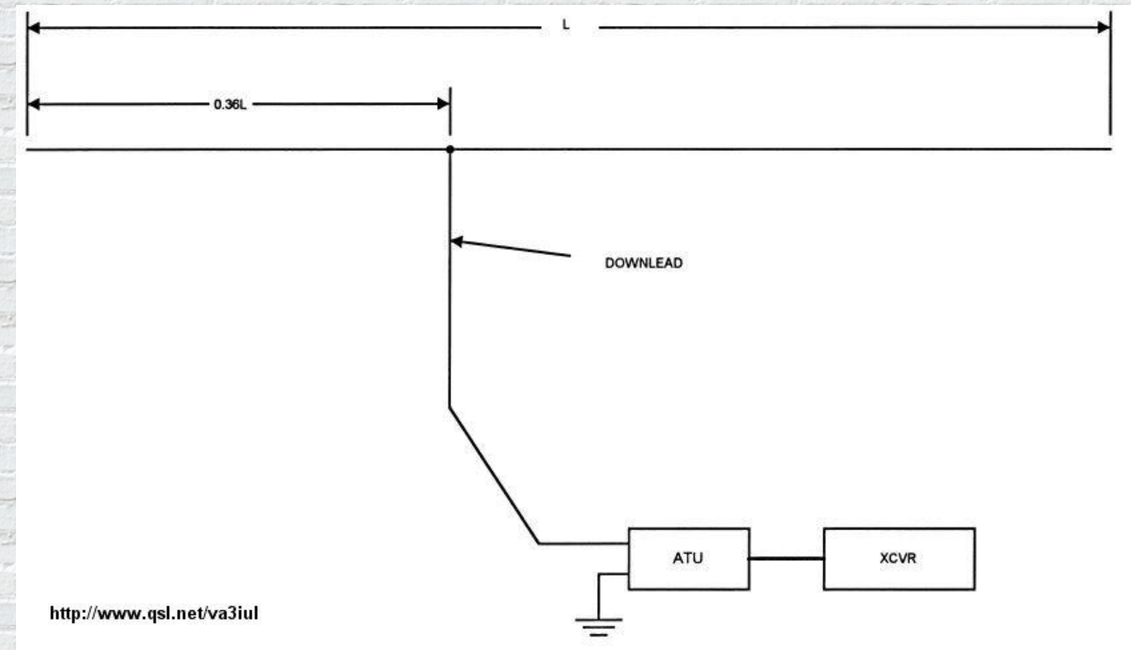
04 - Swallow-Tail Antenna



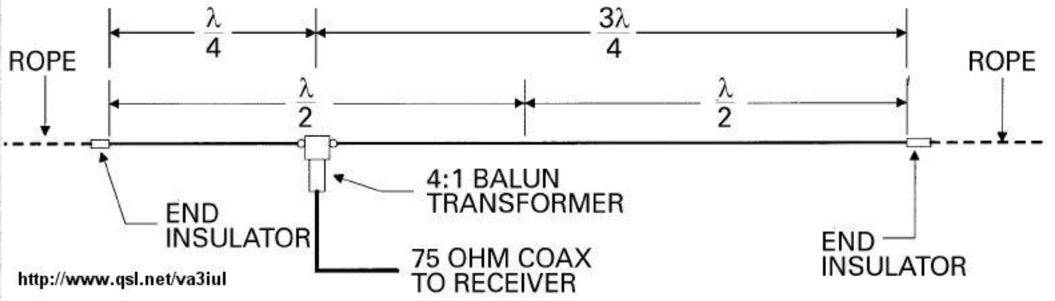
05 - Random Length Radiator Wire Antenna


RANDOM LENGTH RADIATOR WIRE
COAX TO RECEIVER
ANTENNA TUNING UNIT
QUARTER WAVELENGTH RADIALS
EARTH CONNECTION
http://www.qsl.net/va3iul

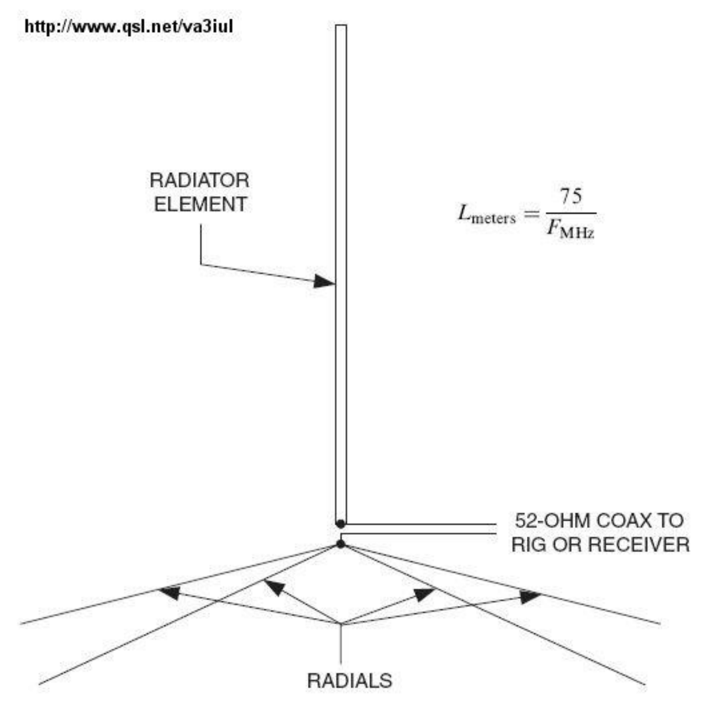
06 - Windom Antenna



07 - Windom Antenna - Feed with coax cable

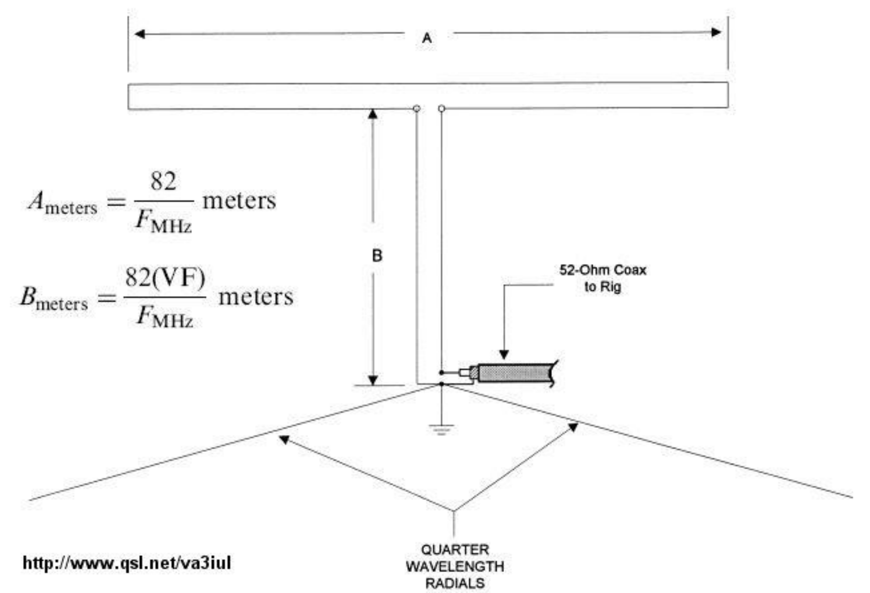


08 - Quarter Wavelength Vertical Antenna



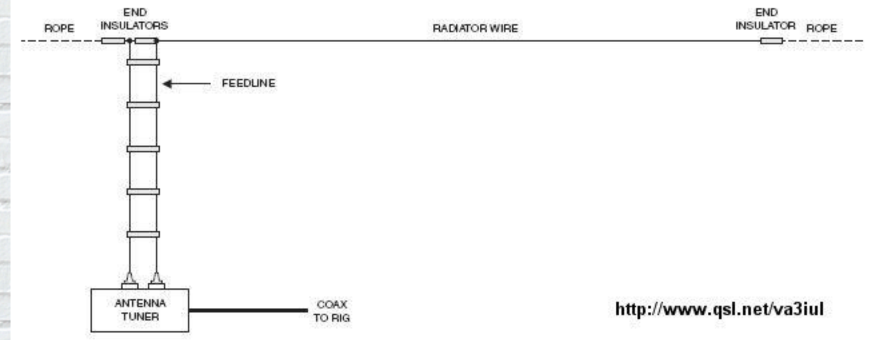
http://www.qsl.net/va3iul
RADIATOR ELEMENT
$L_{\text{meters}} = \frac{75}{F_{\text{MHz}}}$
52-OHM COAX TO RIG OR RECEIVER
RADIALS

09 - Folded Marconi Tee Antenna

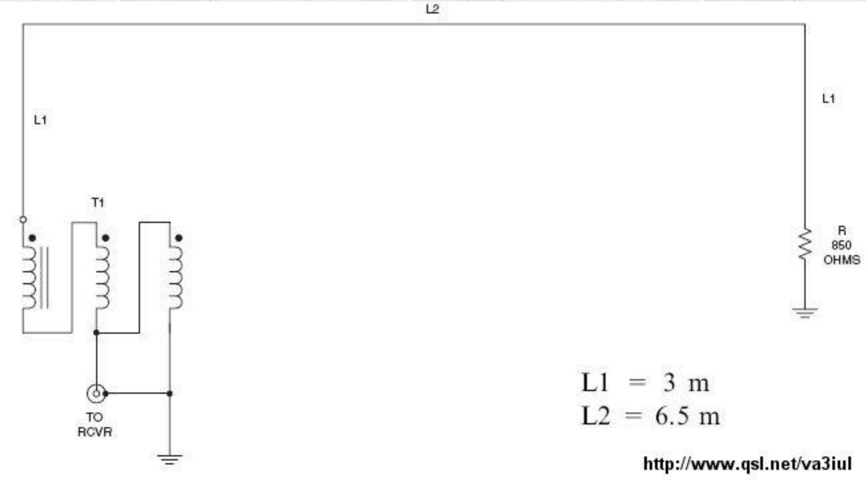


A
B
$A_{\text{meters}} = \frac{82}{F_{\text{MHz}}}$ meters
$B_{\text{meters}} = \frac{82(VF)}{F_{\text{MHz}}}$ meters
52-Ohm Coax to Rig
QUARTER WAVELENGTH RADIALS
http://www.qsl.net/va3iul

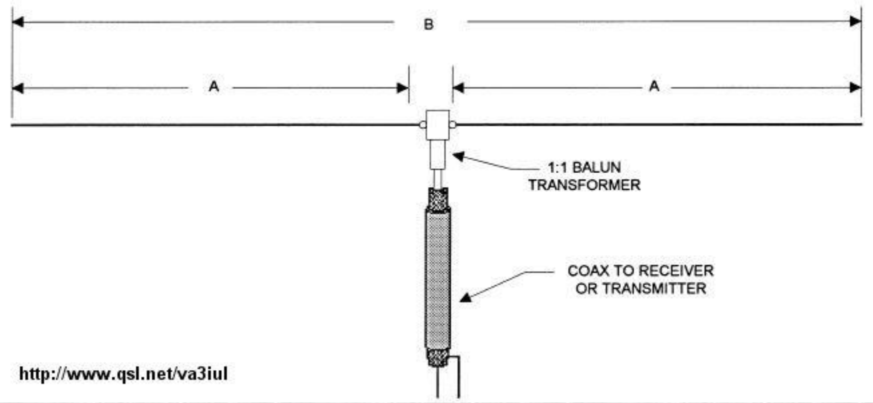
10 - Zeppelin Antenna



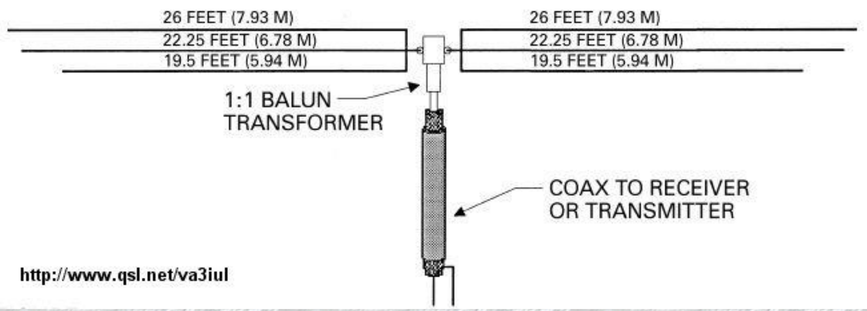
11 - EWE Antenna



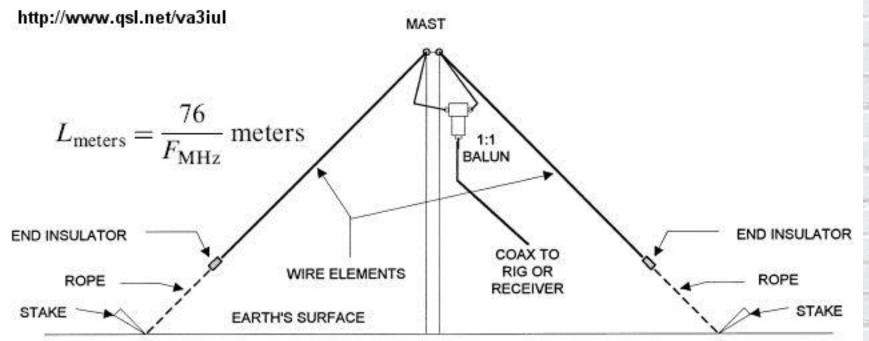
12 - Dipole Antenna - Balun



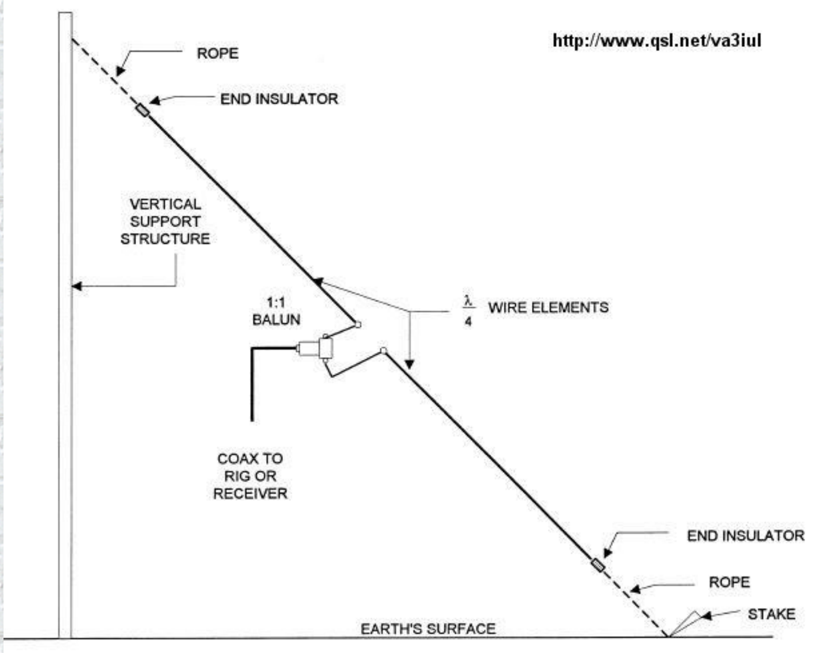
13 - Multiband Dipole Antenna



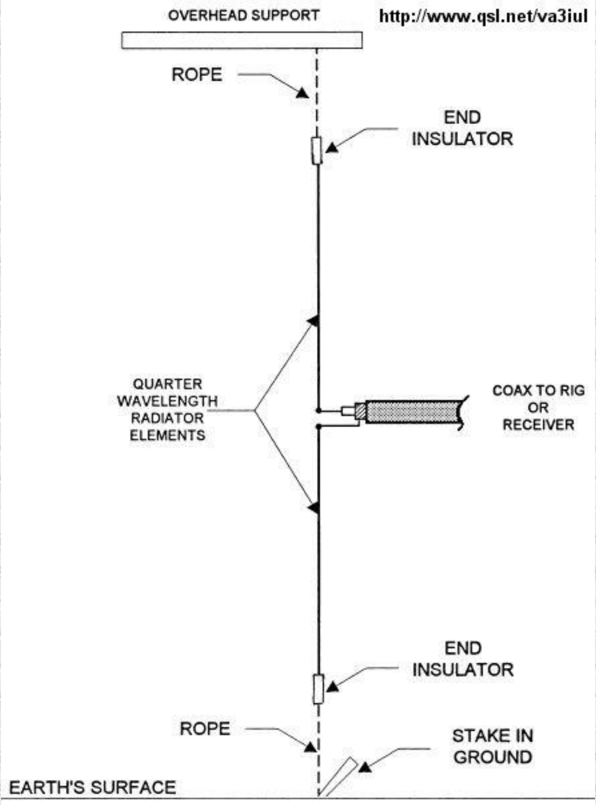
14 - Inverted-Vee Antenna



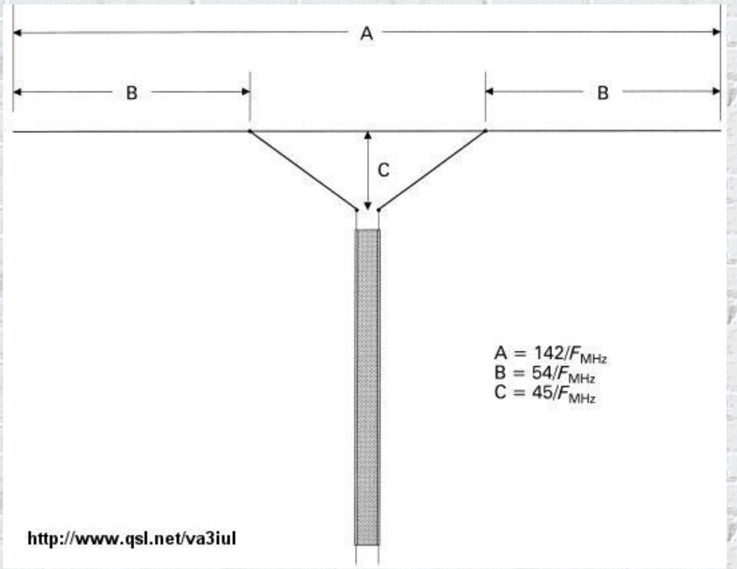
15 - Sloping Dipole Antenna



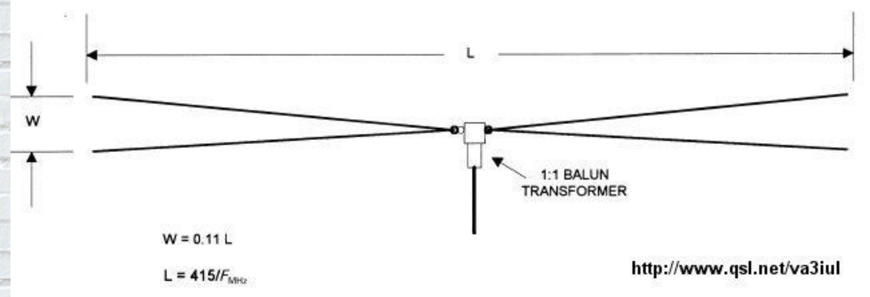
16 - Vertical Dipole



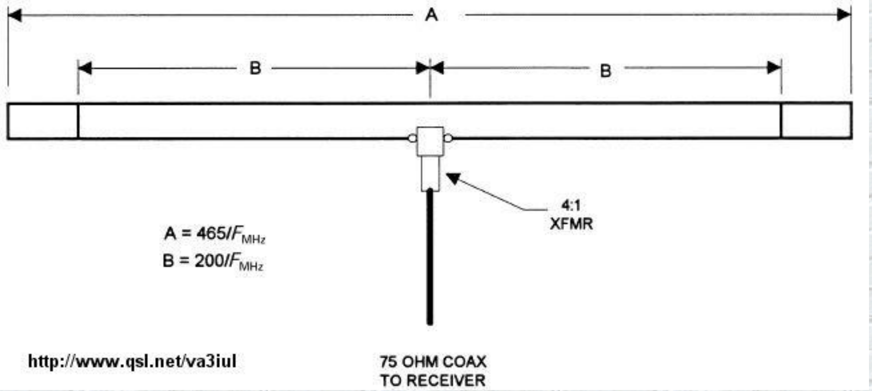
17 - Delta Fed Dipole Antenna



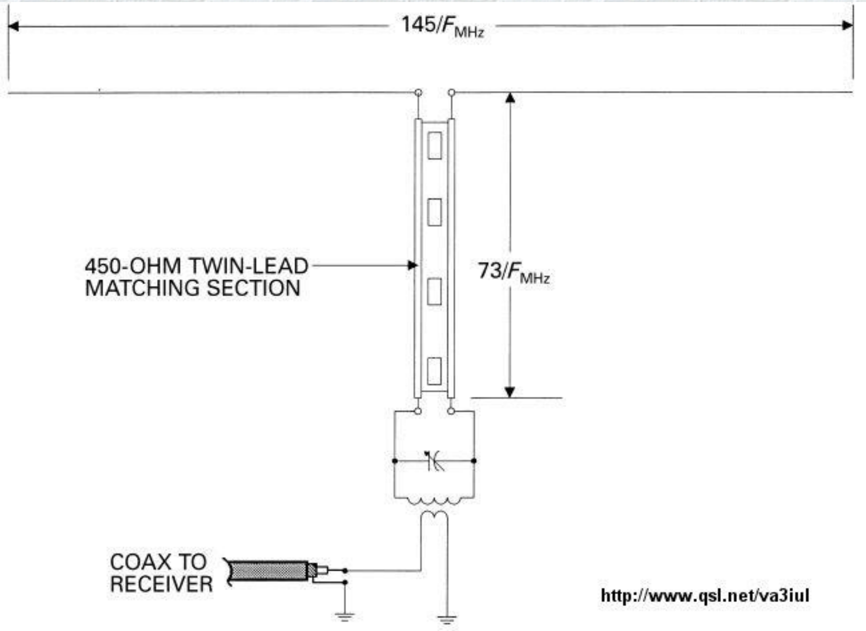
18 - Bow-Tie Dipole Antenna



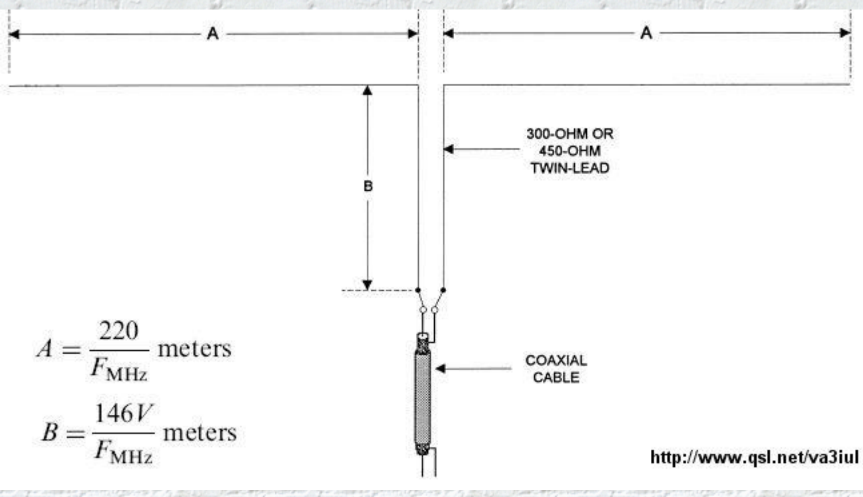
19 - Bow-Tie Folded Dipole Antenna for RX



20 - Multiband Tuned Doublet Antenna



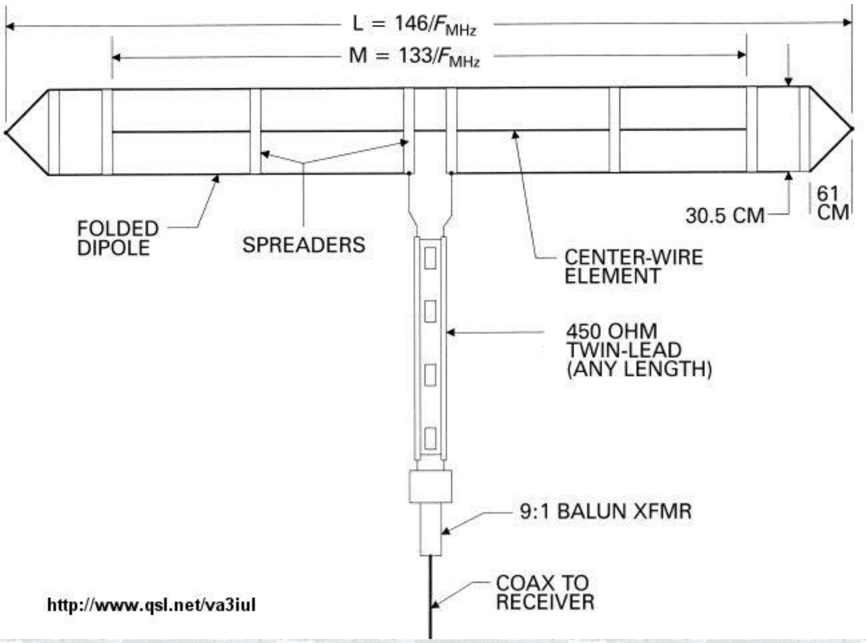
21 - G5RV Antenna



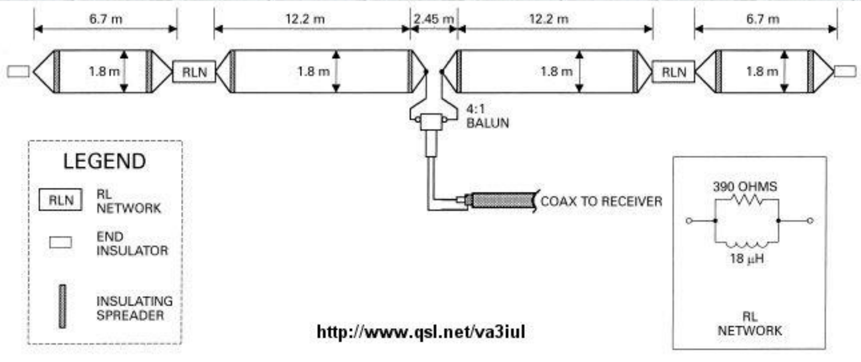
$$A = \frac{220}{F_{\mathrm{MHz}}}\ \text{meters}$$

$$B = \frac{146V}{F_{\mathrm{MHz}}}\ \text{meters}$$

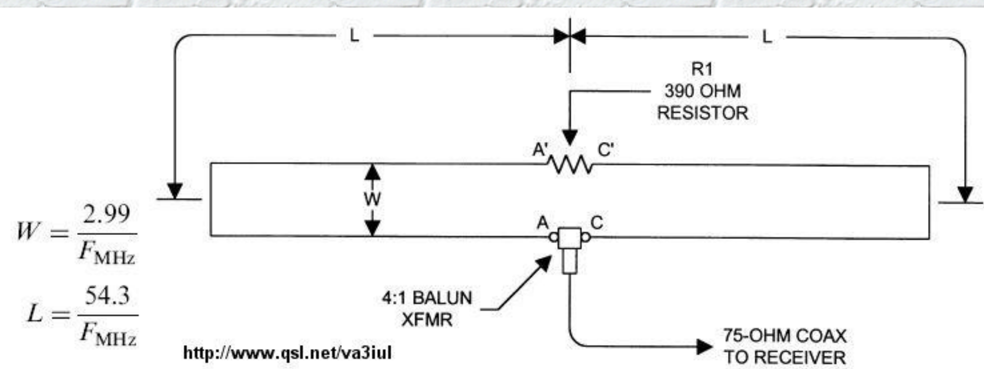
22 - Wideband Dipole Antenna



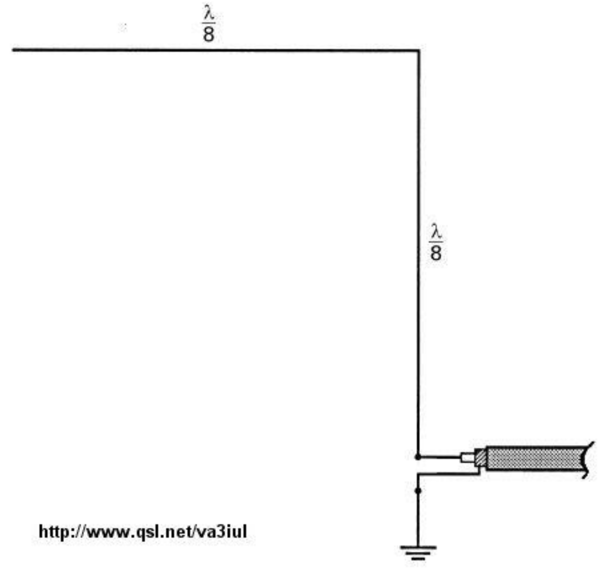
23 - Wideband Dipole for Receiving



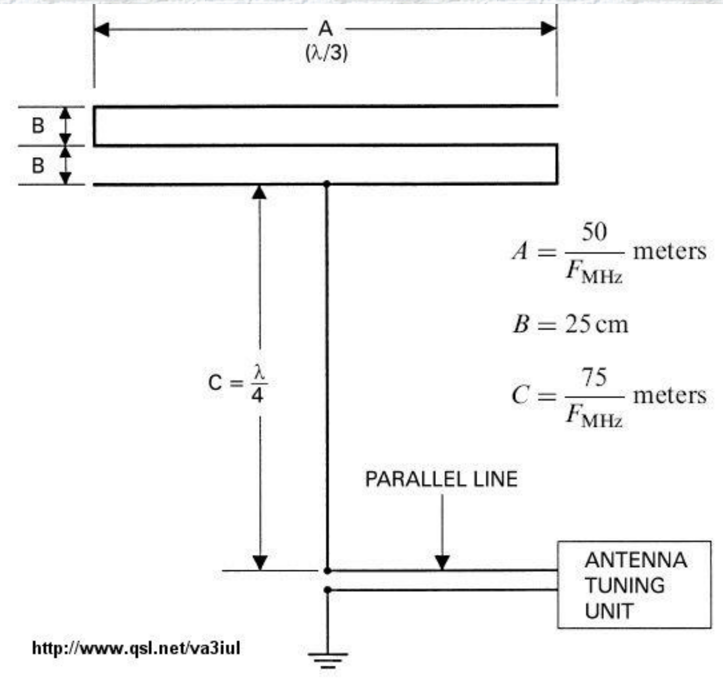
24 - Tilted Folded Dipole Antenna


L
L
R1
390 OHM
RESISTOR
A'
C'
W
A
C
4:1 BALUN XFMR
75-OHM COAX TO RECEIVER
$W = \frac{2.99}{F_{MHz}}$
$L = \frac{54.3}{F_{MHz}}$
http://www.qsl.net/va3iul

25 - Right Angle Marconi Antenna



26 - Linearly Loaded Tee Antenna

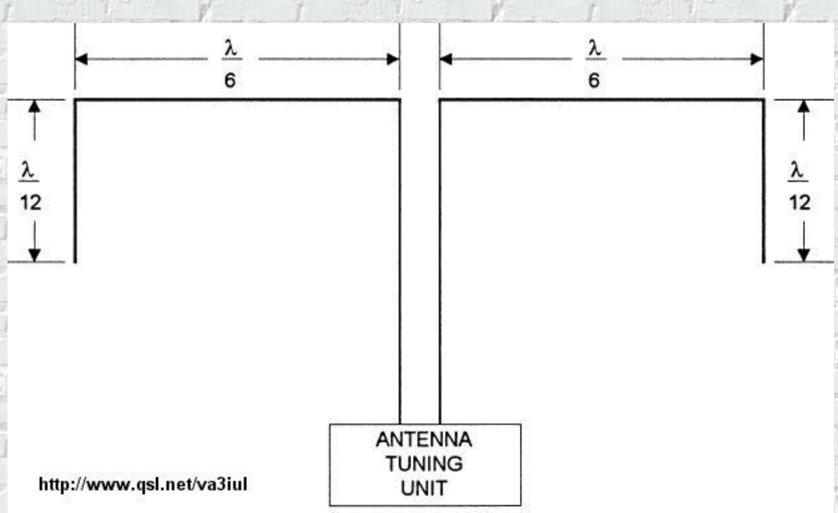


$$A = \frac{50}{F_{\mathrm{MHz}}}\ \text{meters}$$

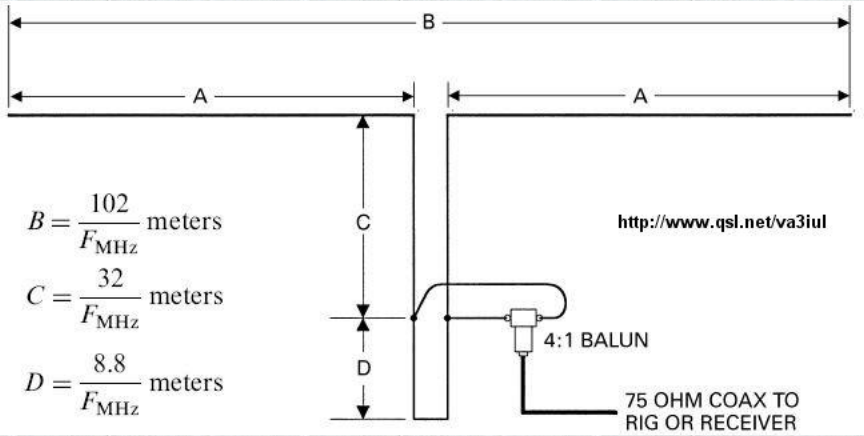
$$B = 25\,\text{cm}$$

$$C = \frac{75}{F_{\mathrm{MHz}}}\ \text{meters}$$

27 - Reduced Size Dipole Antenna

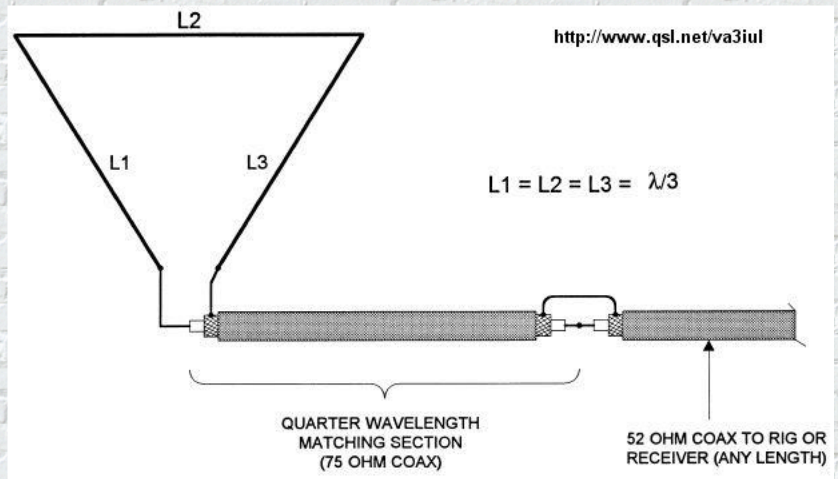


28 - Doublet Dipole Antenna


B
A
A
$B = \frac{102}{F_{\text{MHz}}}$ meters
$C = \frac{32}{F_{\text{MHz}}}$ meters
$D = \frac{8.8}{F_{\text{MHz}}}$ meters
C
D
http://www.qsl.net/va3iul
4:1 BALUN
75 OHM COAX TO
RIG OR RECEIVER

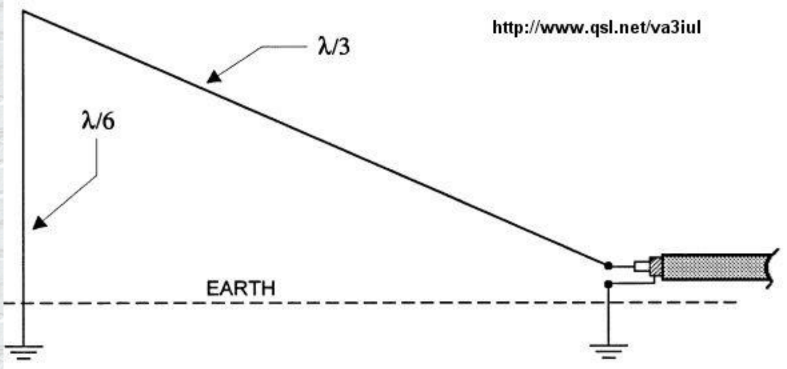
---

29 - Delta Loop Antenna



---

30 - Half Delta Loop Antenna



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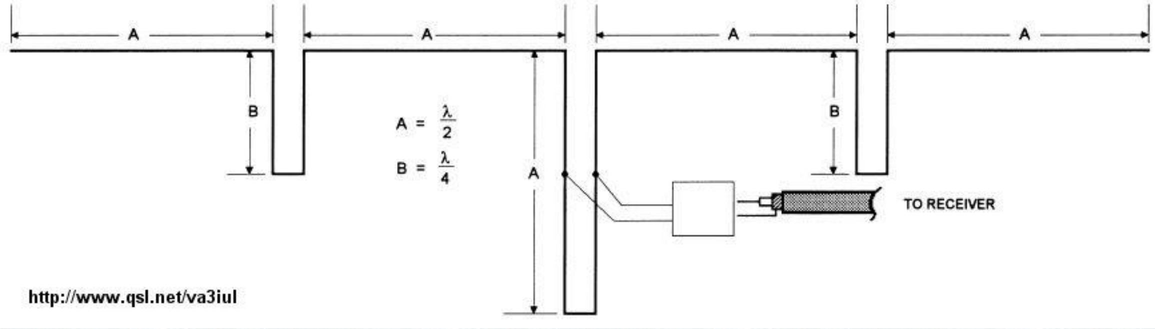
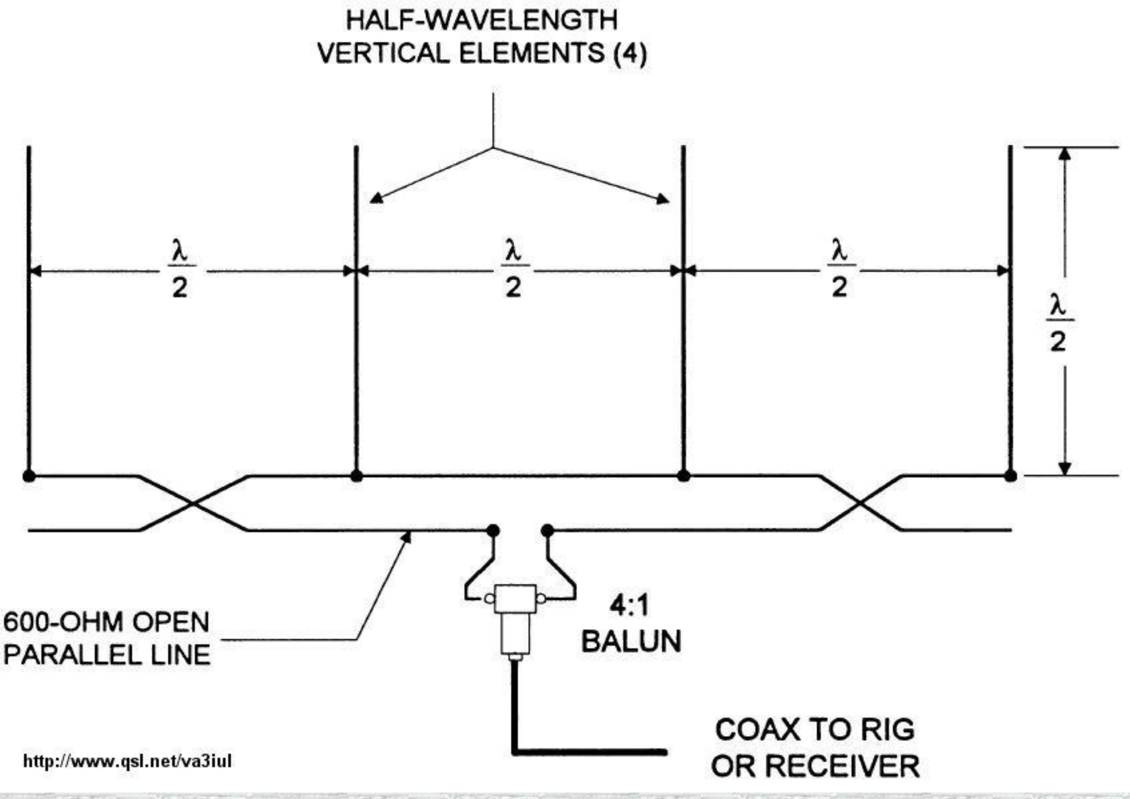
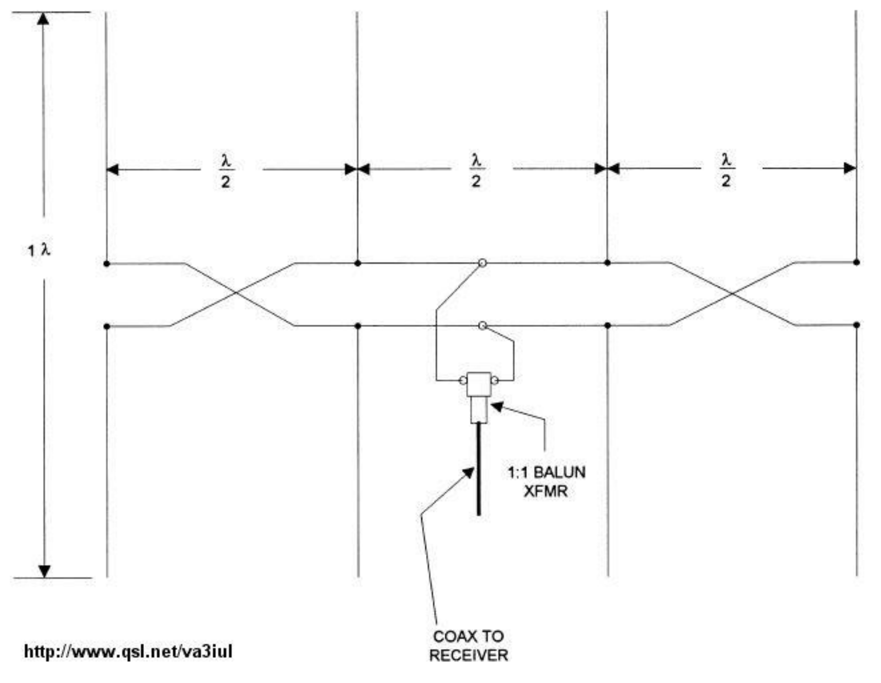
31 - Collinear Franklin Antenna



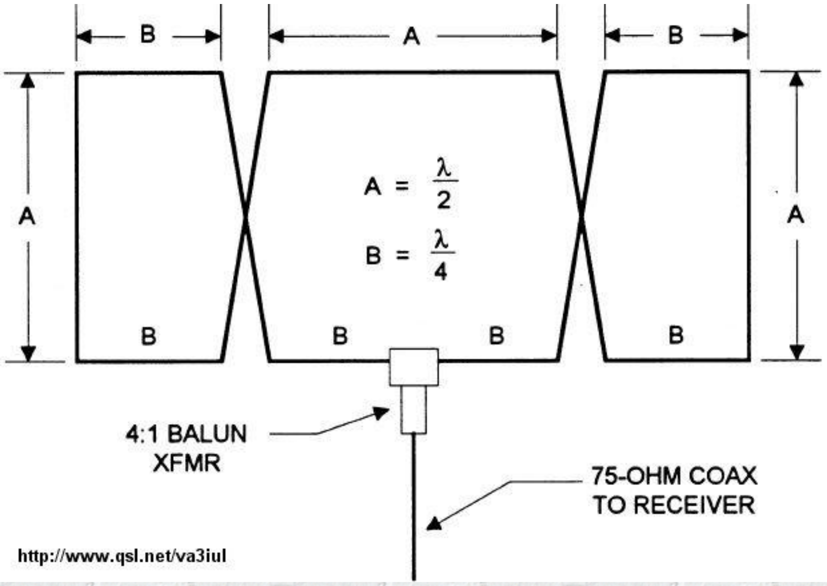
32 - Four Element Broadside Antenna



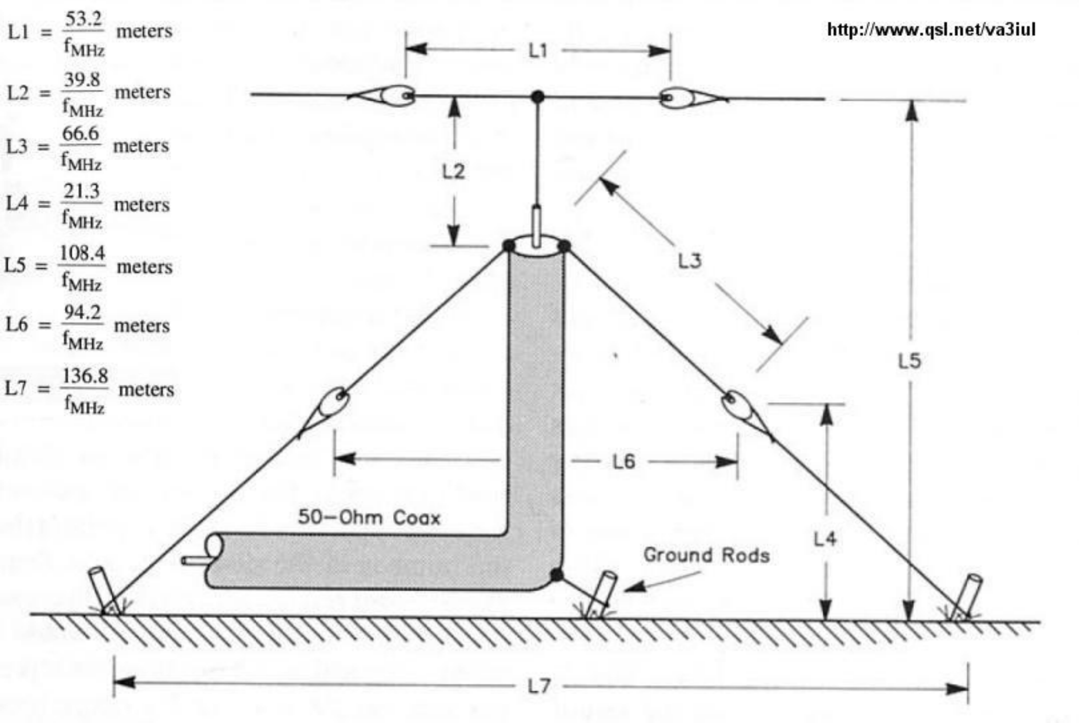
33 - The Lazy-H Array Antenna



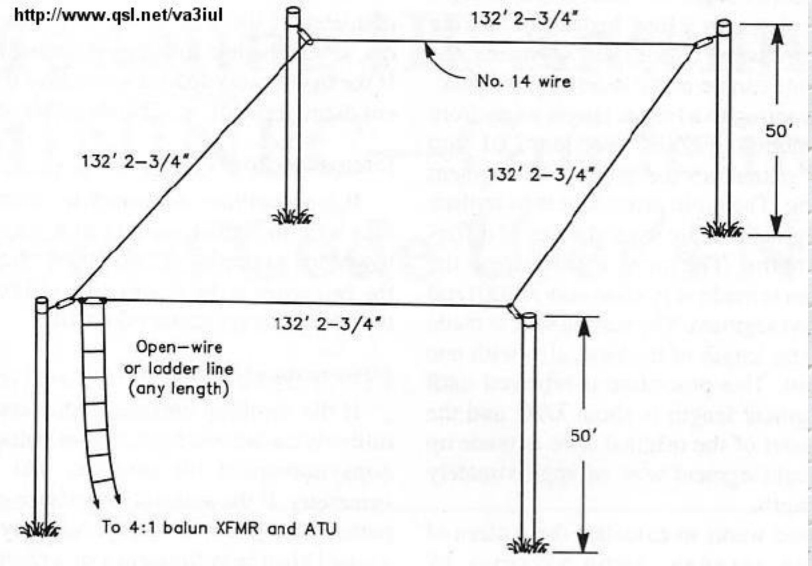
34 - Sterba Curtain Array Antenna



35 - T-L DX Antenna



36 - 1.9 MHz Full-wave Loop Antenna



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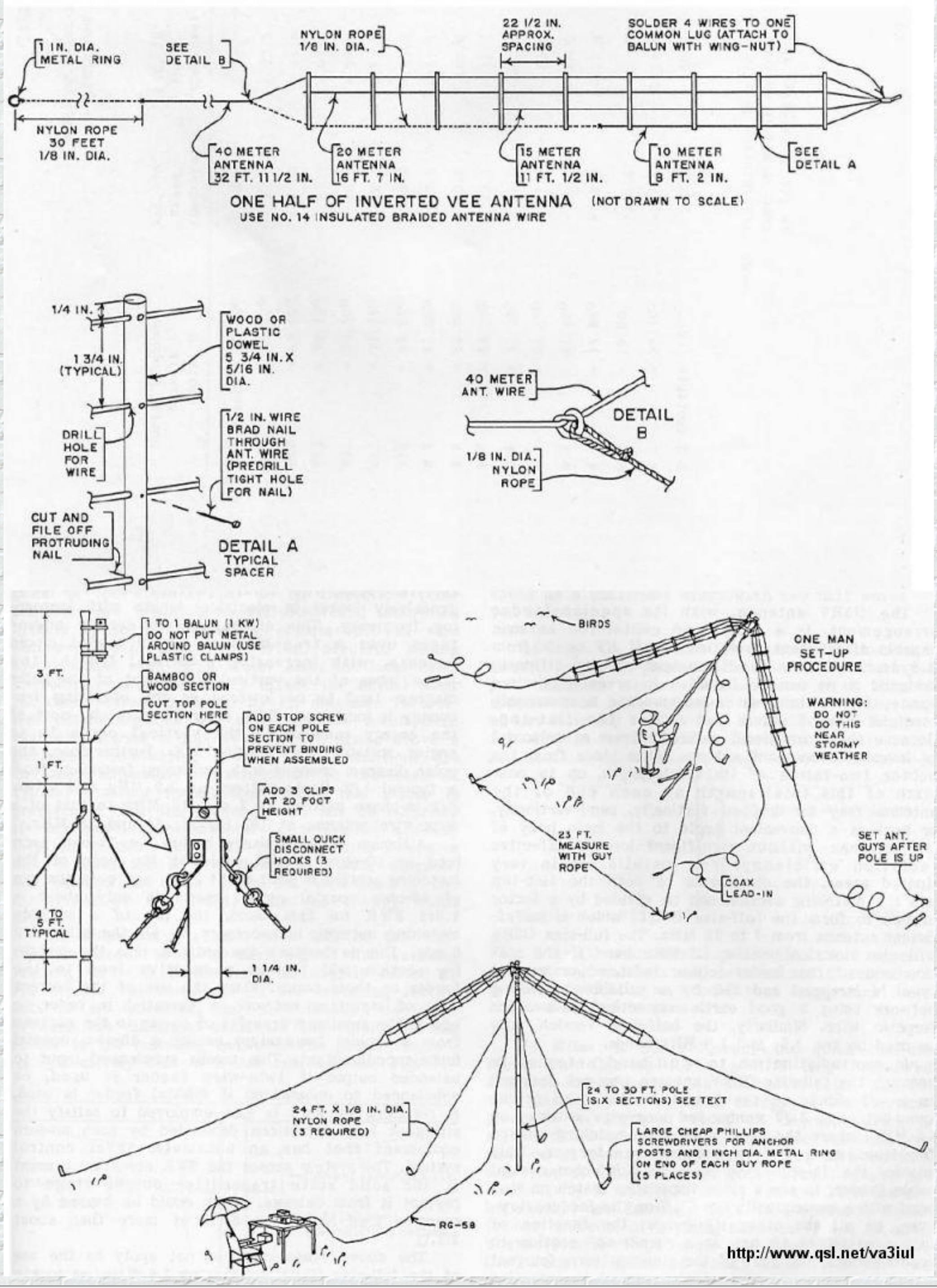
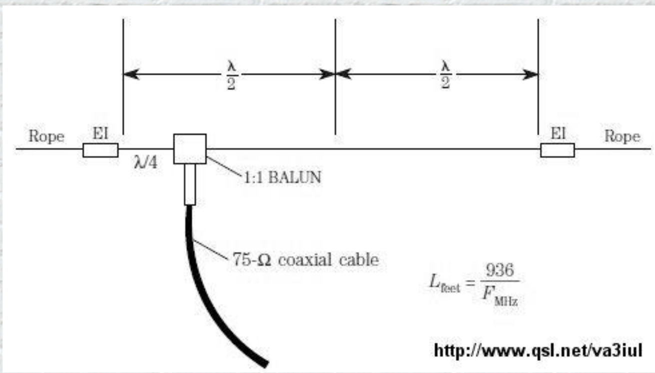
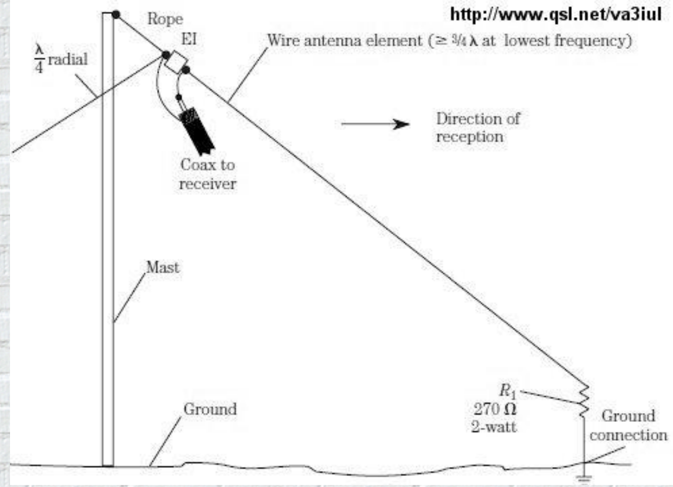
37 - Multi-Band Portable Antenna


1 IN. DIA. METAL RING
SEE DETAIL B
NYLON ROPE 1/8 IN. DIA.
22 1/2 IN. APPROX. SPACING
SOLDER 4 WIRES TO ONE COMMON LUG (ATTACH TO BALUN WITH WING-NUT)
NYLON ROPE 30 FEET 1/8 IN. DIA.
40 METER ANTENNA 32 FT. 11 1/2 IN.
20 METER ANTENNA 16 FT. 7 IN.
15 METER ANTENNA 11 FT. 1/2 IN.
10 METER ANTENNA 8 FT. 2 IN.
SEE DETAIL A
ONE HALF OF INVERTED VEE ANTENNA (NOT DRAWN TO SCALE)
USE NO. 14 INSULATED BRAIDED ANTENNA WIRE
1/4 IN.
1 3/4 IN. (TYPICAL)
WOOD OR PLASTIC DOWEL 5 3/4 IN. X 5/16 IN. DIA.
1/2 IN. WIRE BRAD NAIL THROUGH ANT. WIRE (PREDRILL TIGHT HOLE FOR NAIL)
DRILL HOLE FOR WIRE
CUT AND FILE OFF PROTRUDING NAIL
DETAIL A
TYPICAL SPACER
40 METER ANT. WIRE
DETAIL B
1/8 IN. DIA. NYLON ROPE
1 TO 1 BALUN (1 KW) DO NOT PUT METAL AROUND BALUN (USE PLASTIC CLAMPS)
3 FT.
BAMBOO OR WOOD SECTION
CUT TOP POLE SECTION HERE
ADD STOP SCREW ON EACH POLE SECTION TO PREVENT BINDING WHEN ASSEMBLED
1 FT.
ADD 3 CLIPS AT 20 FOOT HEIGHT
SMALL QUICK DISCONNECT HOOKS (3 REQUIRED)
4 TO 5 FT. TYPICAL
1 1/4 IN. DIA.
BIRDS
ONE MAN SET-UP PROCEDURE
WARNING: DO NOT DO THIS NEAR STORMY WEATHER
23 FT. MEASURE WITH GUY ROPE
COAX LEAD-IN
SET ANT. GUYS AFTER POLE IS UP
24 TO 30 FT. POLE (SIX SECTIONS) SEE TEXT
24 FT. X 1/8 IN. DIA. NYLON ROPE (3 REQUIRED)
LARGE CHEAP PHILLIPS SCREWDRIVERS FOR ANCHOR POSTS AND 1 INCH DIA. METAL RING ON END OF EACH GUY ROPE (5 PLACES)
RG-58
http://www.qsl.net/va3iul

38 - Off-center-fed Full-wave Doublet Antenna

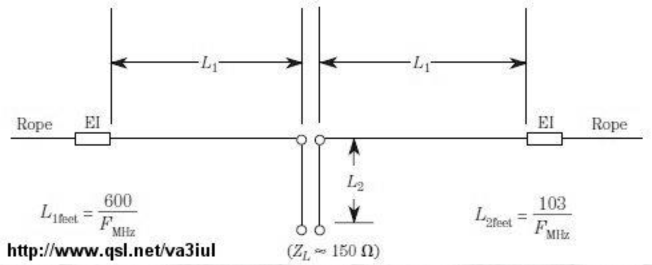

λ/2
λ/2
Rope
EI
λ/4
1:1 BALUN
EI
Rope
75-Ω coaxial cable
$L_{\text{feet}} = \frac{936}{F_{\text{MHz}}}$
http://www.qsl.net/va3iul

39 - Terminated Sloper Antenna


http://www.qsl.net/va3iul
Rope
EI
$\frac{\lambda}{4}$ radial
Wire antenna element (≥ 3/4 λ at lowest frequency)
Direction of reception
Coax to receiver
Mast
Ground
R_1
270 Ω
2-watt
Ground connection

---

40 - Double Extended Zepp Antenna


L_1
L_1
Rope
EI
EI
Rope
L_2
$L_{1\text{feet}} = \frac{600}{F_{\text{MHz}}}$
$L_{2\text{feet}} = \frac{103}{F_{\text{MHz}}}$
http://www.qsl.net/va3iul
($Z_L \approx 150\ \Omega$)

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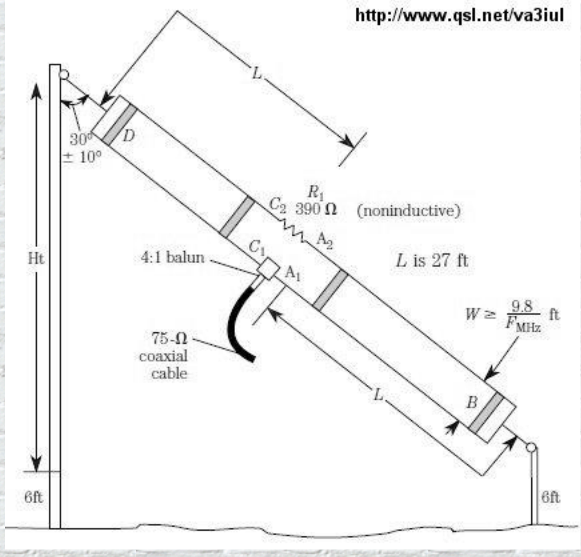
41 - TCFTFD Dipole Antenna



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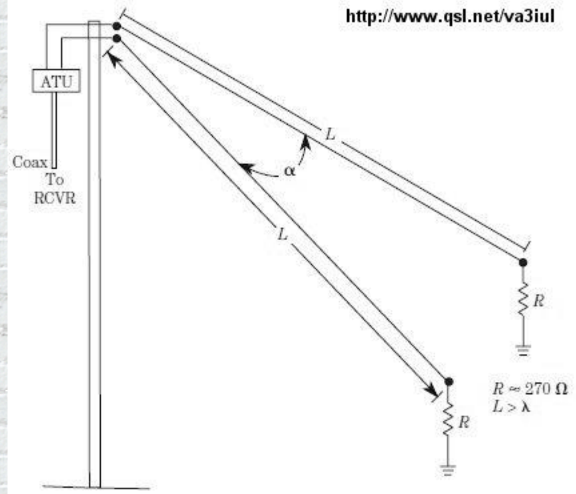
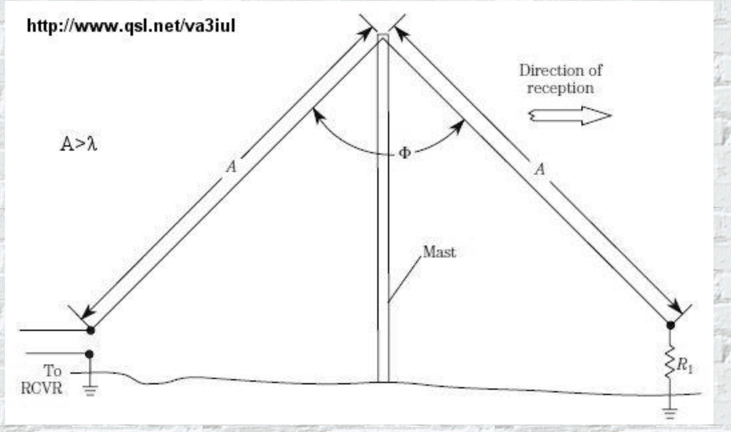
42 - Vee-Sloper Antenna



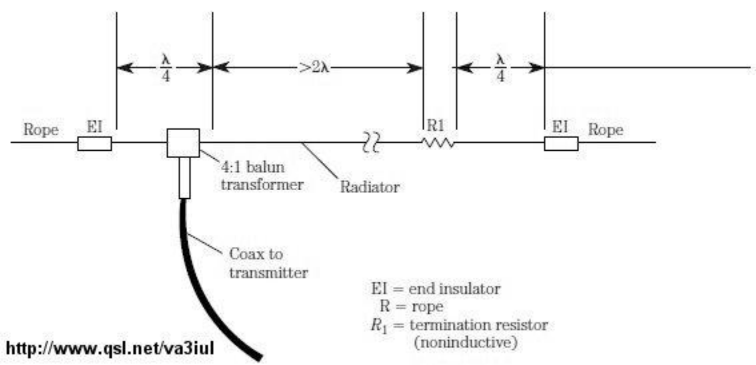
---

43 - Rhombic Inverted-Vee Antenna



---

44 - Counterpoise Longwire



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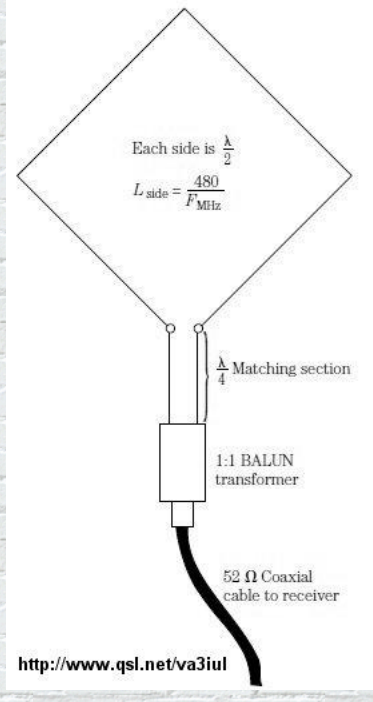
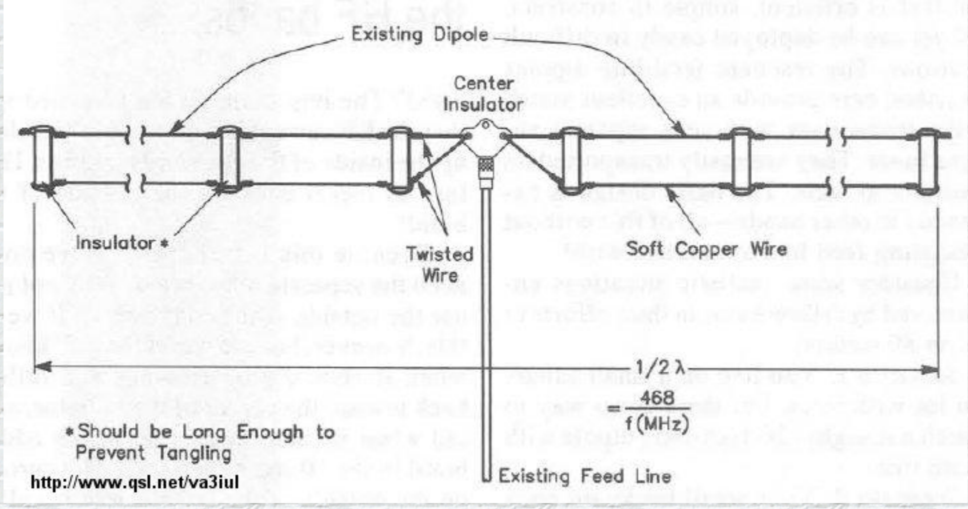
45 - Bisquare Loop Antenna


Each side is $\frac{\lambda}{2}$
$L_{side} = \frac{480}{F_{MHz}}$
$\frac{\lambda}{4}$ Matching section
1:1 BALUN transformer
52 Ω Coaxial cable to receiver
http://www.qsl.net/va3iul

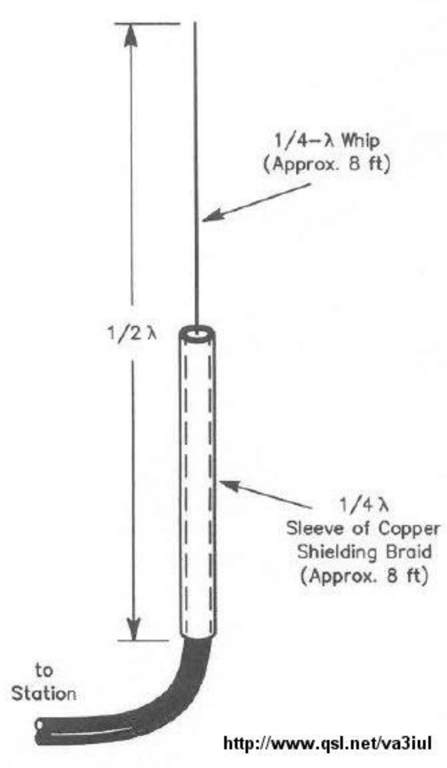
---

46 - Piggyback Antenna for 10m



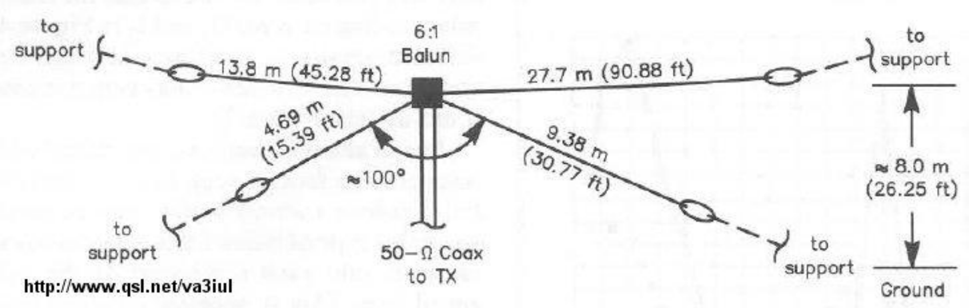
---

47 - Vertical Sleeve Antenna for 10m



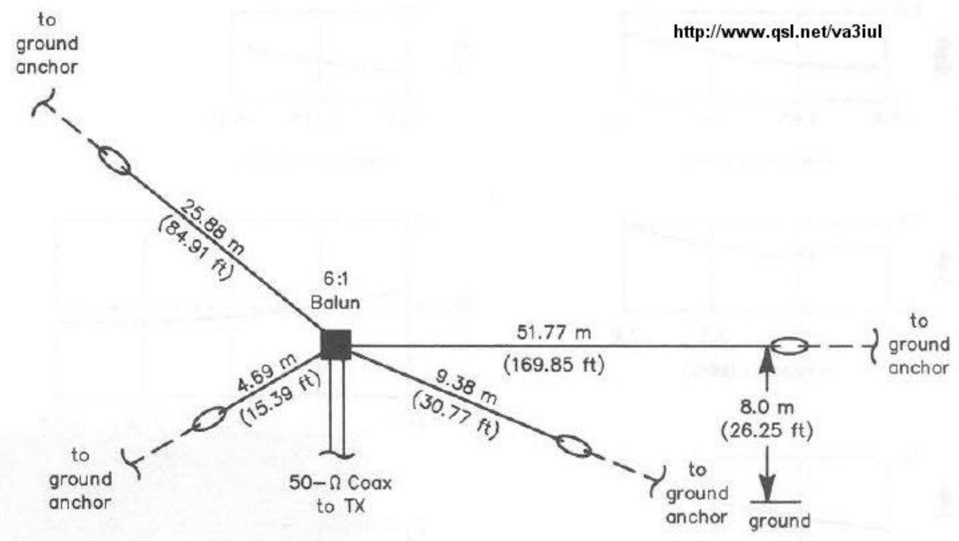
---

48 - Double Windom Antenna

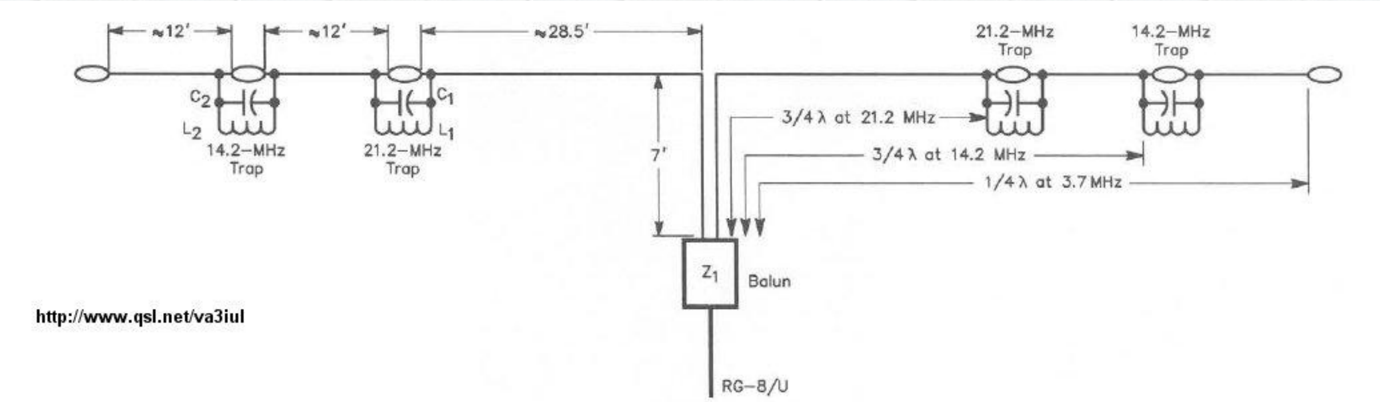


---

49 - Double Windom for 9 Bands



50 - Collinear Trap Antenna

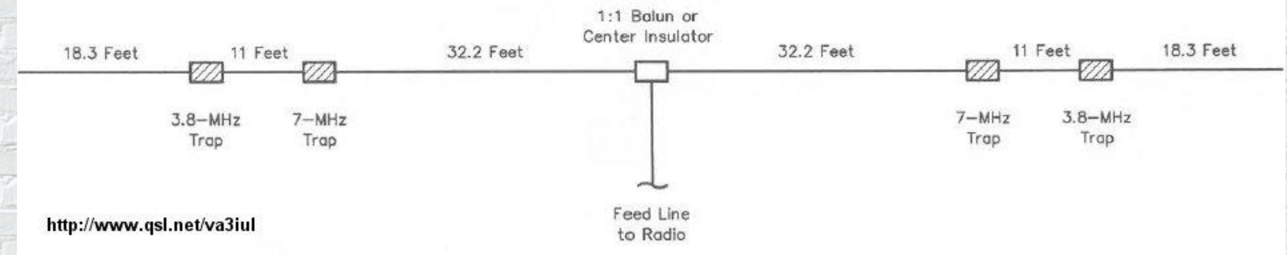


C1, C2—25-pf. 6000-volt disk ceramic. See text.
L_1—Approx. 2 µH–4¾ turns No. 18, 2¼-inches diam., ⅜ inch long, or 5 turns No. 18, 2-inch diam., 16 tpi. See text.

L_2—Approx. 5 µH.—8 turns No. 18, 2¼-inch dia., ⅝ inch long, or 9 turns No. 18, 2-inch diam. 16 tpi. See text.
Z_1—1 to 1 balun.

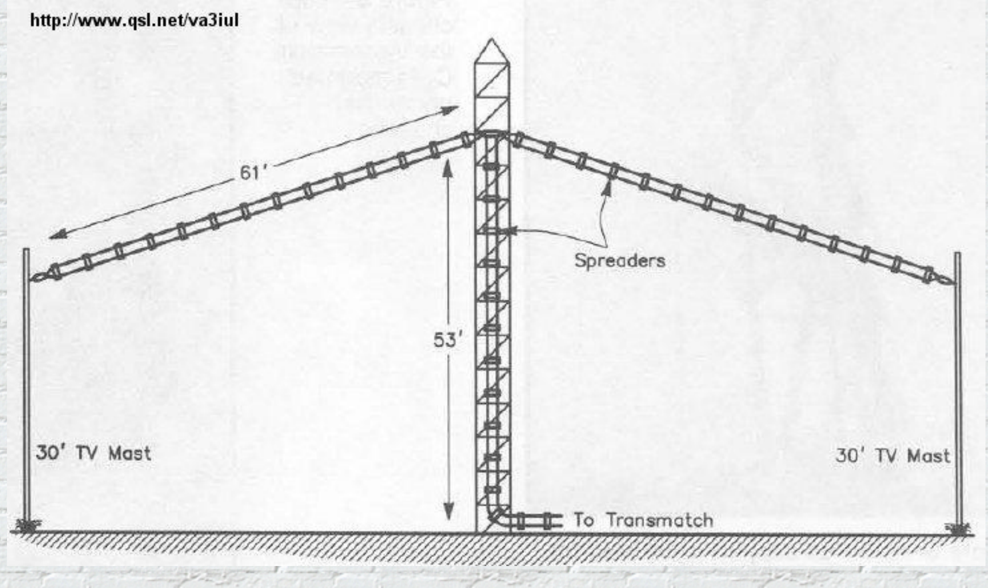
---

51 - Short Dipole Antenna for 40m - 80m - 160m



---

52 - Center Fed-Zepp Antenna for 80m - 40m



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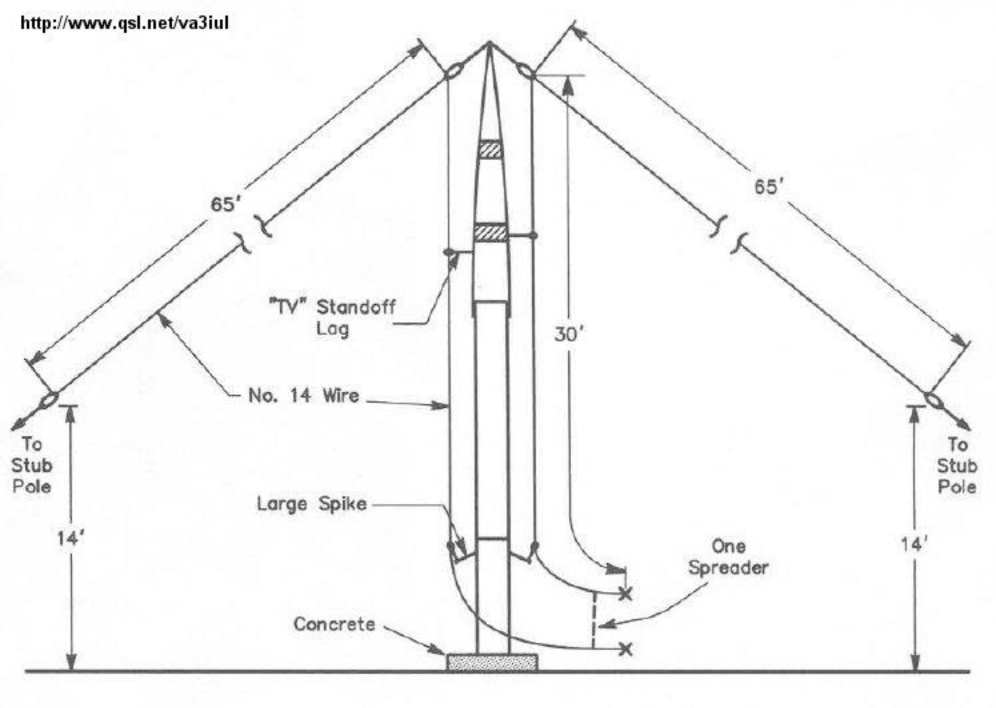
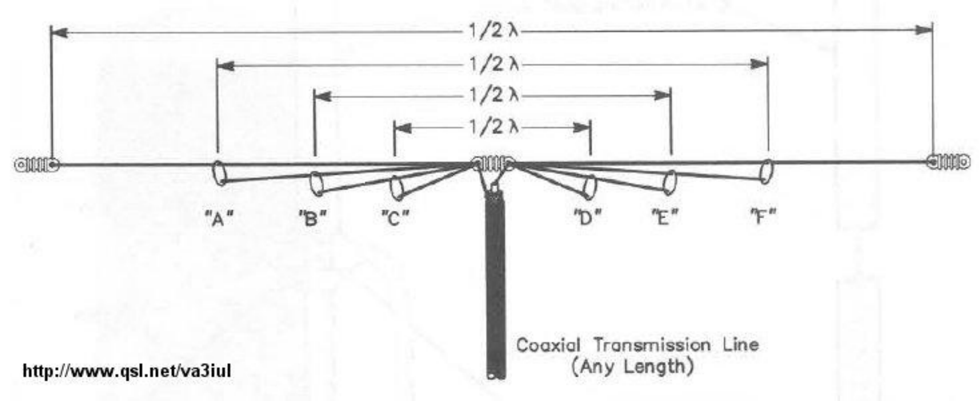
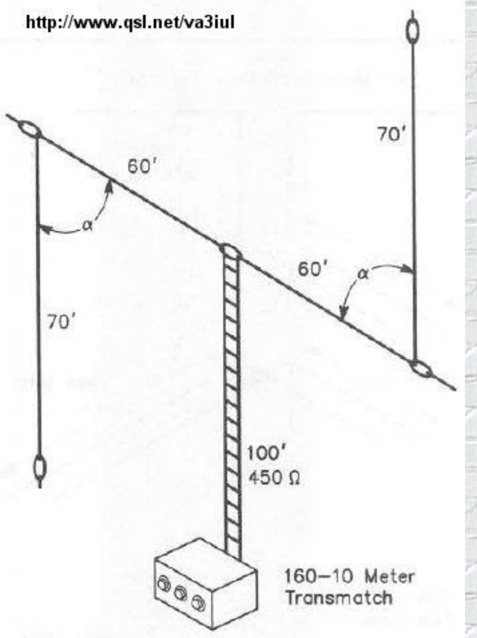
53 - All-Bands Antenna



54 - All-Bands Dipole Antenna


1/2 λ
1/2 λ
1/2 λ
1/2 λ
"A"
"B"
"C"
"D"
"E"
"F"
Coaxial Transmission Line (Any Length)
http://www.qsl.net/va3iul

55 - Multiband Z Antenna



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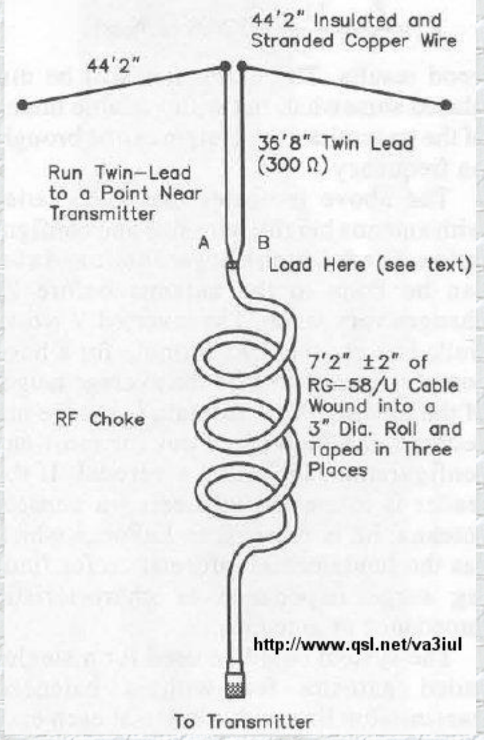
56 - Multiband Dipole Antenna



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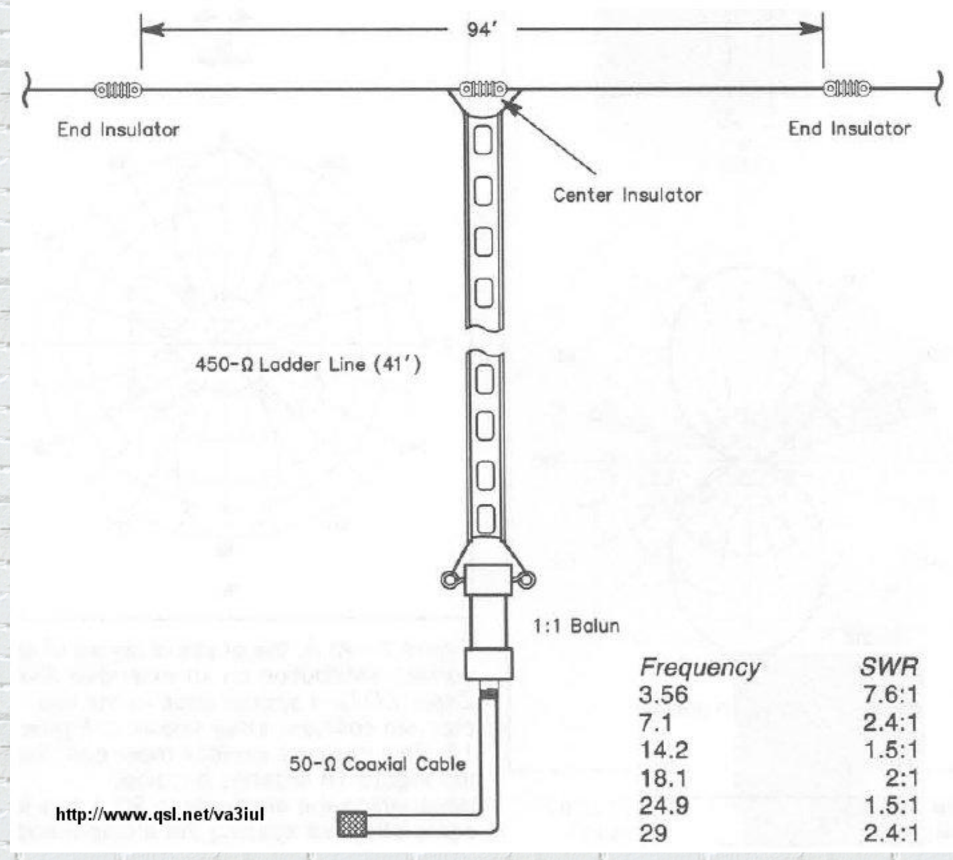
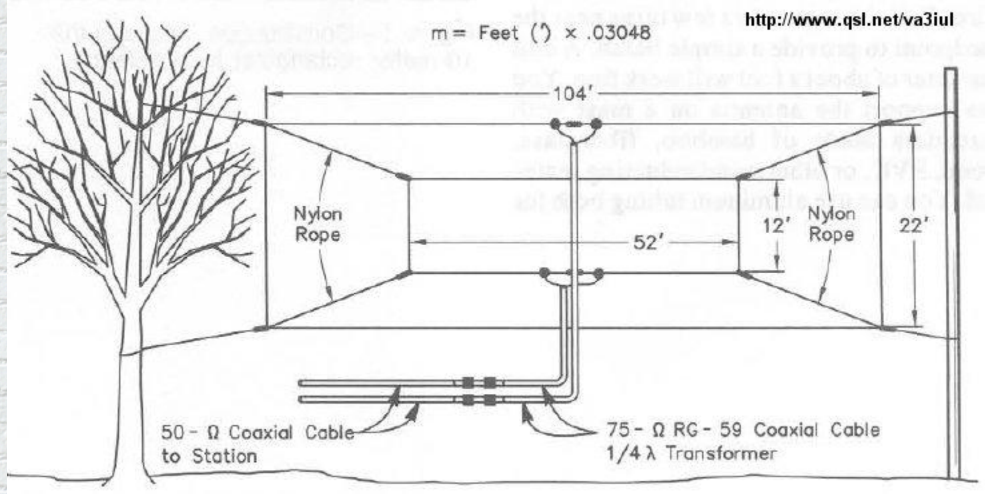
57 - Five-Bands No-Tuner Antenna



Frequency	*SWR*
3.56	7.6:1
7.1	2.4:1
14.2	1.5:1
18.1	2:1
24.9	1.5:1
29	2.4:1

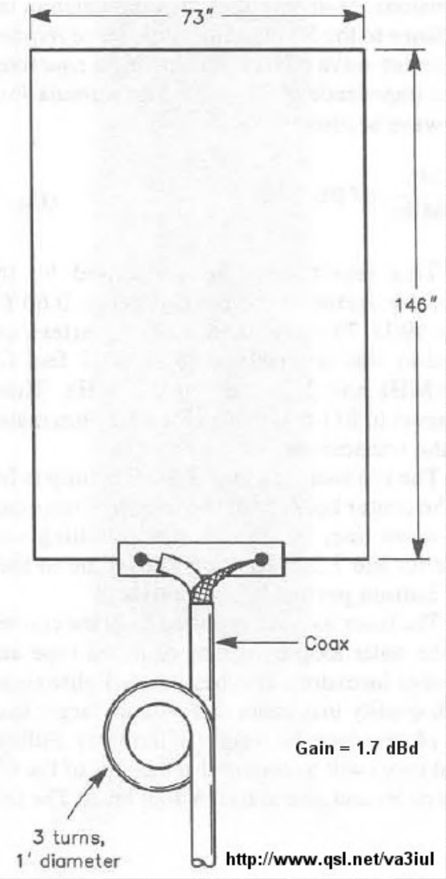
---

58 - Dualband Full-wave Loop Antenna for 80m-40m

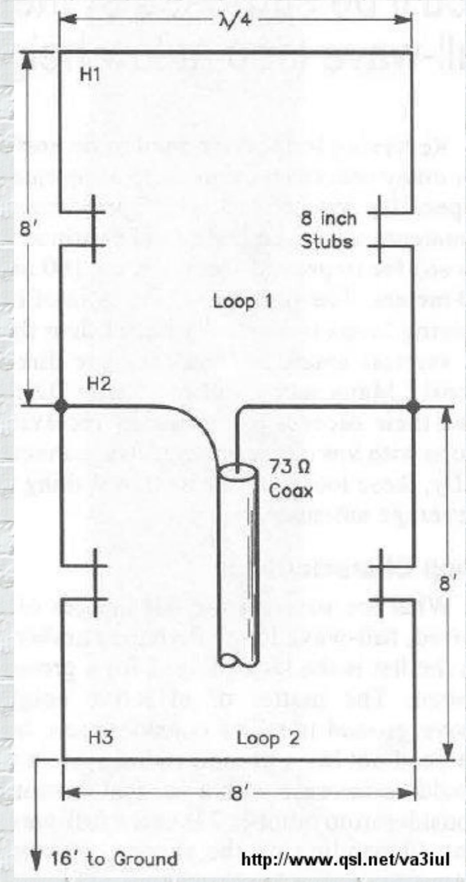

m = Feet (') × .03048
http://www.qsl.net/va3iul
104'
Nylon Rope
52'
12'
Nylon Rope
22'
50 - Ω Coaxial Cable to Station
75 - Ω RG - 59 Coaxial Cable 1/4 λ Transformer

---

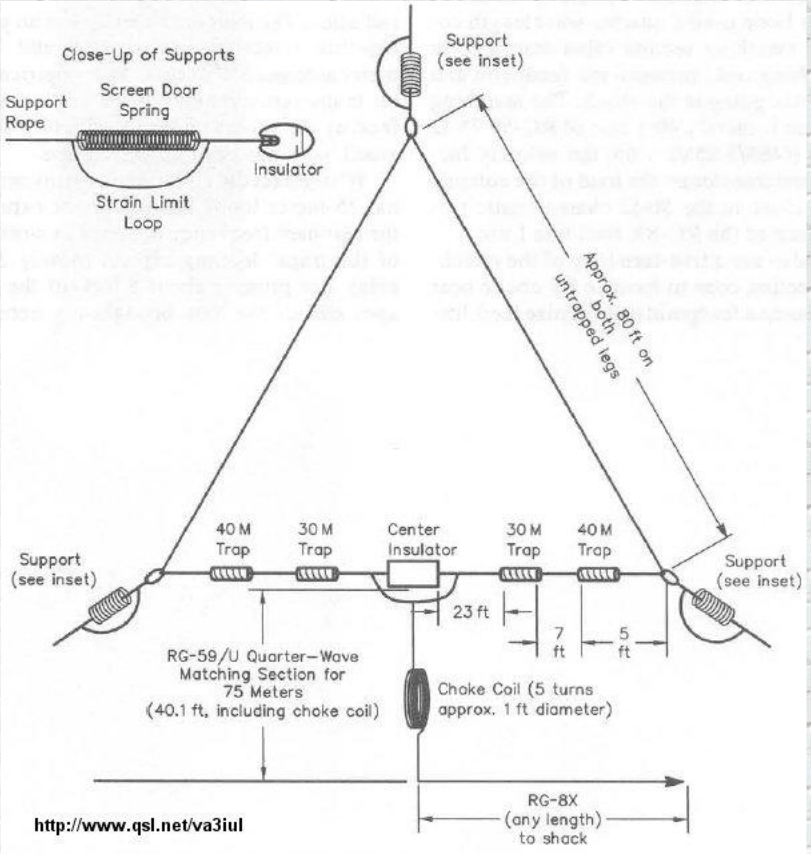
59 - Loop Antenna for 10m



60 - Lazy Quad Antenna for 10m



61 - Tri-band Delta Loop Antenna for 80m - 40m - 30m


Close-Up of Supports
Support Rope
Screen Door Spring
Insulator
Strain Limit Loop
Support (see inset)
Approx. 80 ft on both untrapped legs
40 M Trap
30 M Trap
Center Insulator
30 M Trap
40 M Trap
Support (see inset)
Support (see inset)
23 ft
7 ft
5 ft
RG-59/U Quarter-Wave Matching Section for 75 Meters (40.1 ft, including choke coil)
Choke Coil (5 turns approx. 1 ft diameter)
RG-8X (any length) to shack
http://www.qsl.net/va3iul

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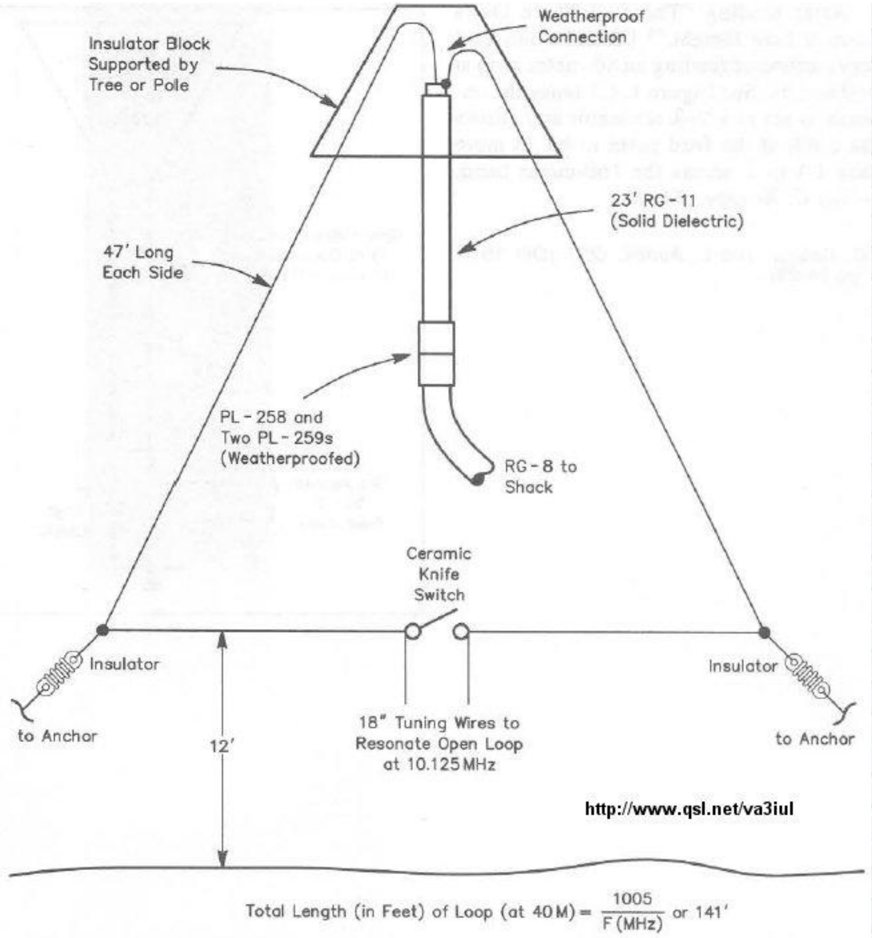
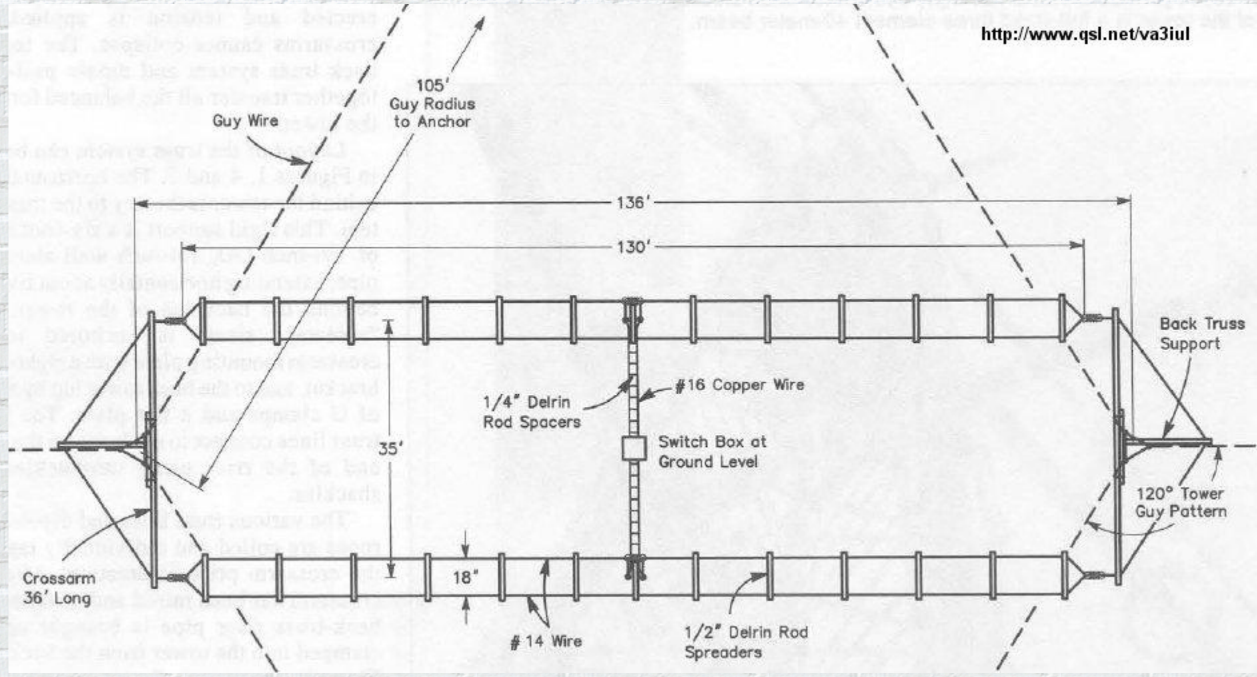
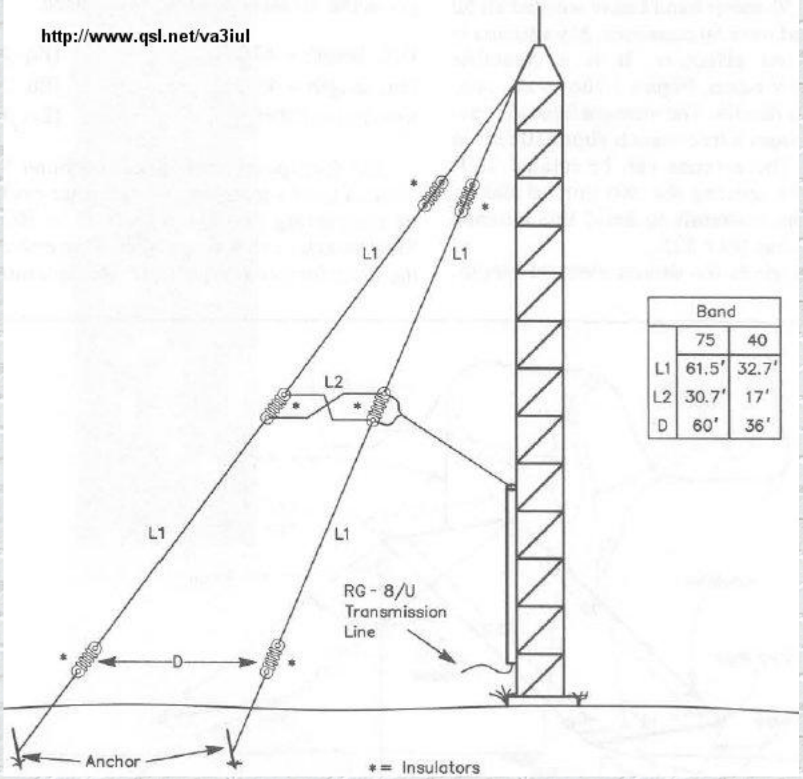
62 - Dual-band Loop Antenna for 30m - 40m


Weatherproof Connection
Insulator Block Supported by Tree or Pole
23' RG-11 (Solid Dielectric)
47' Long Each Side
PL-258 and Two PL-259s (Weatherproofed)
RG-8 to Shack
Ceramic Knife Switch
Insulator
Insulator
to Anchor
to Anchor
12'
18" Tuning Wires to Resonate Open Loop at 10.125 MHz
http://www.qsl.net/va3iul
Total Length (in Feet) of Loop (at 40 M) = 1005 / F (MHz) or 141'

63 - Wire-Beam Antenna for 80m

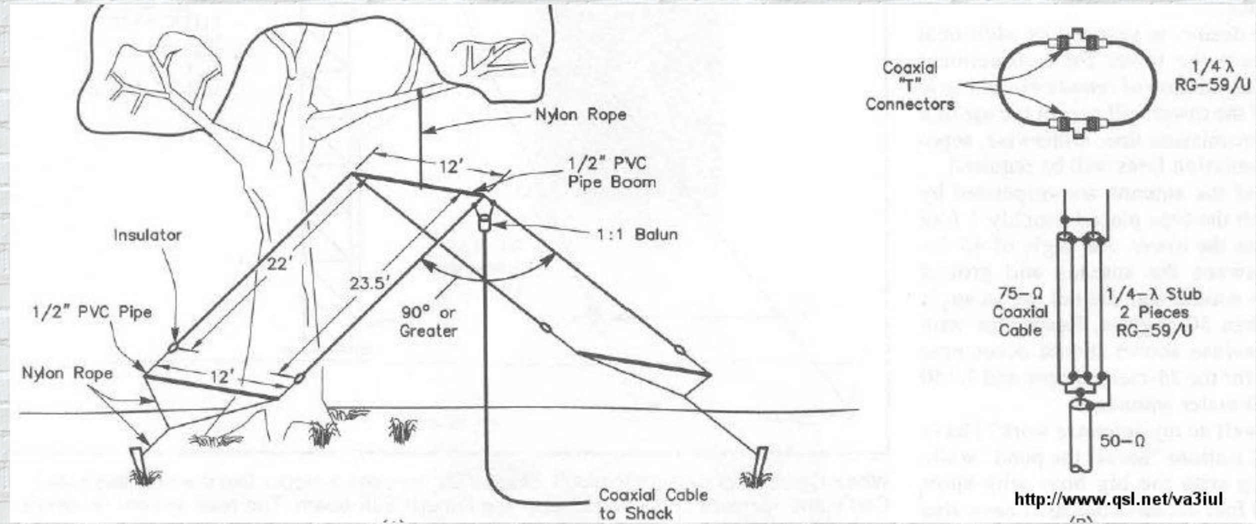


64 - Dual-Band Sloper Antenna

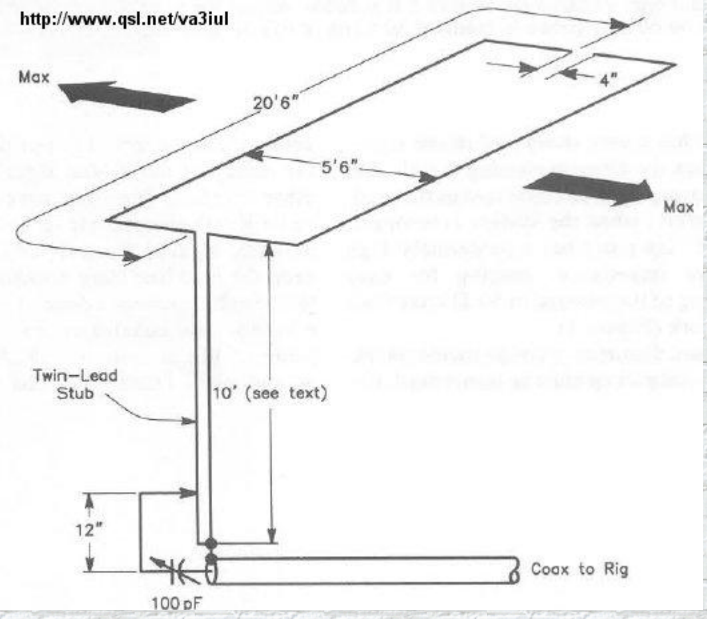


	Band	
	75	40
L1	61.5'	32.7'
L2	30.7'	17'
D	60'	36'

65 - Inverted-V Beam Antenna for 30m



66 - ZL-Special Beam Antenna for 15m



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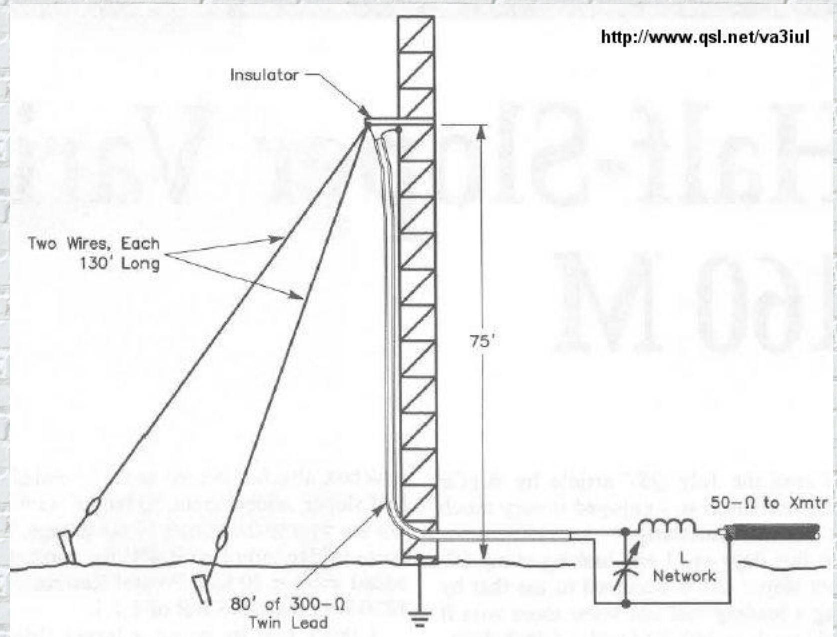
67 - Half-Sloper Antenna for 160m



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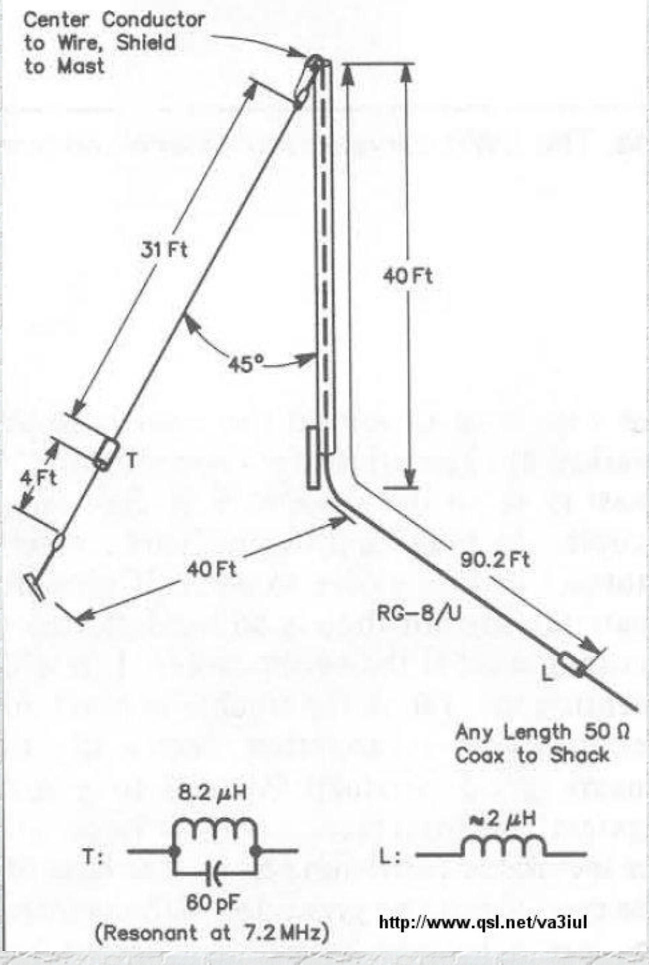
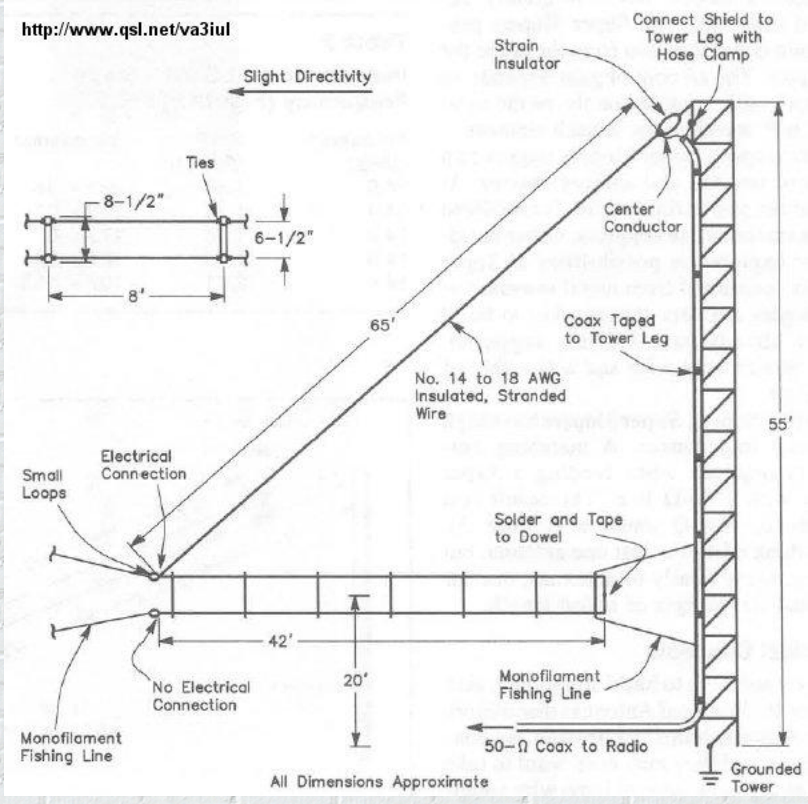
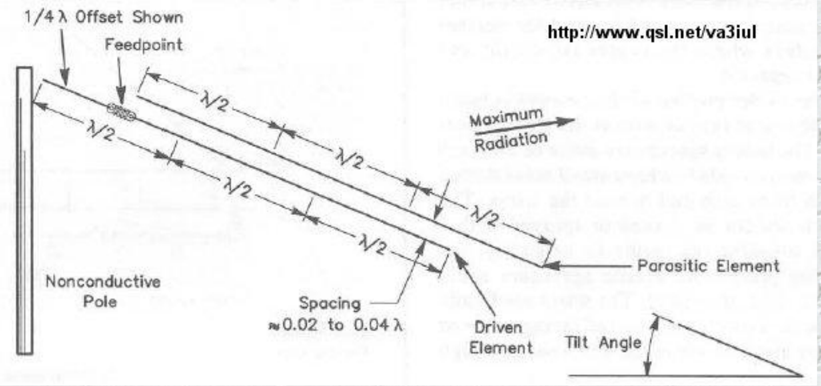
68 - Two-Bands Half Sloper for 80m - 40m


Center Conductor to Wire, Shield to Mast
31 Ft
40 Ft
45°
T
4 Ft
40 Ft
90.2 Ft
RG–8/U
L
Any Length 50 Ω Coax to Shack
8.2 μH
T:
60 pF
(Resonant at 7.2 MHz)
≈2 μH
L:
http://www.qsl.net/va3iul

69 - Linear Loaded Sloper Antenna for 160m



70 - Super-Sloper Antenna



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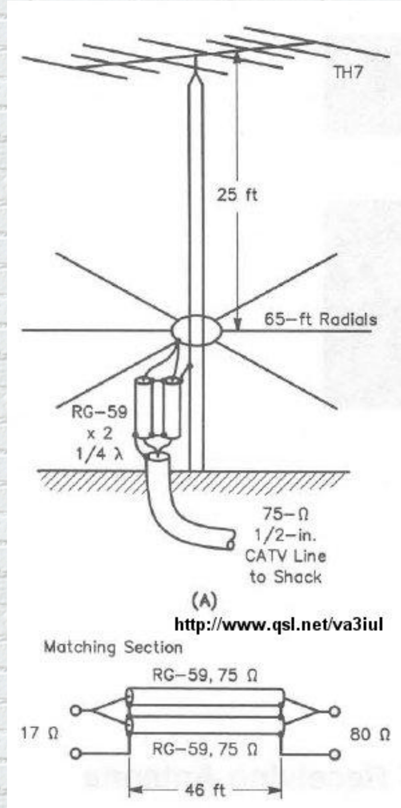
71 - Tower Pole as a Vertical Antenna for 80m



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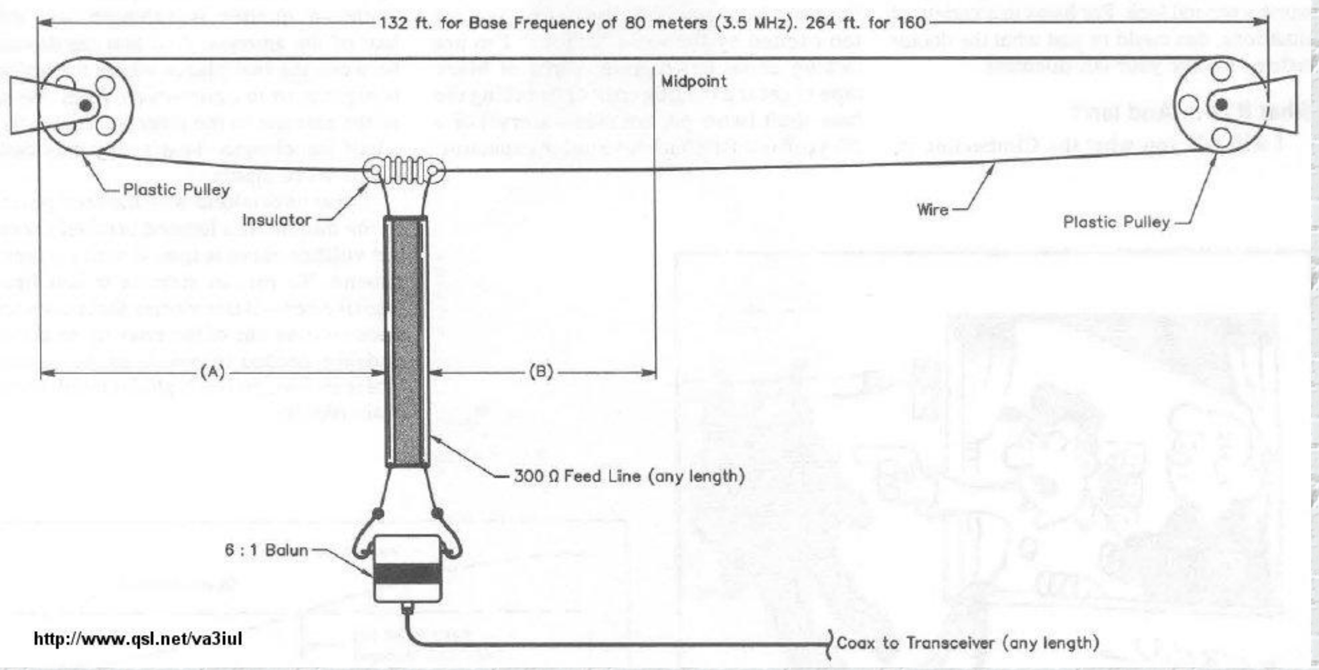
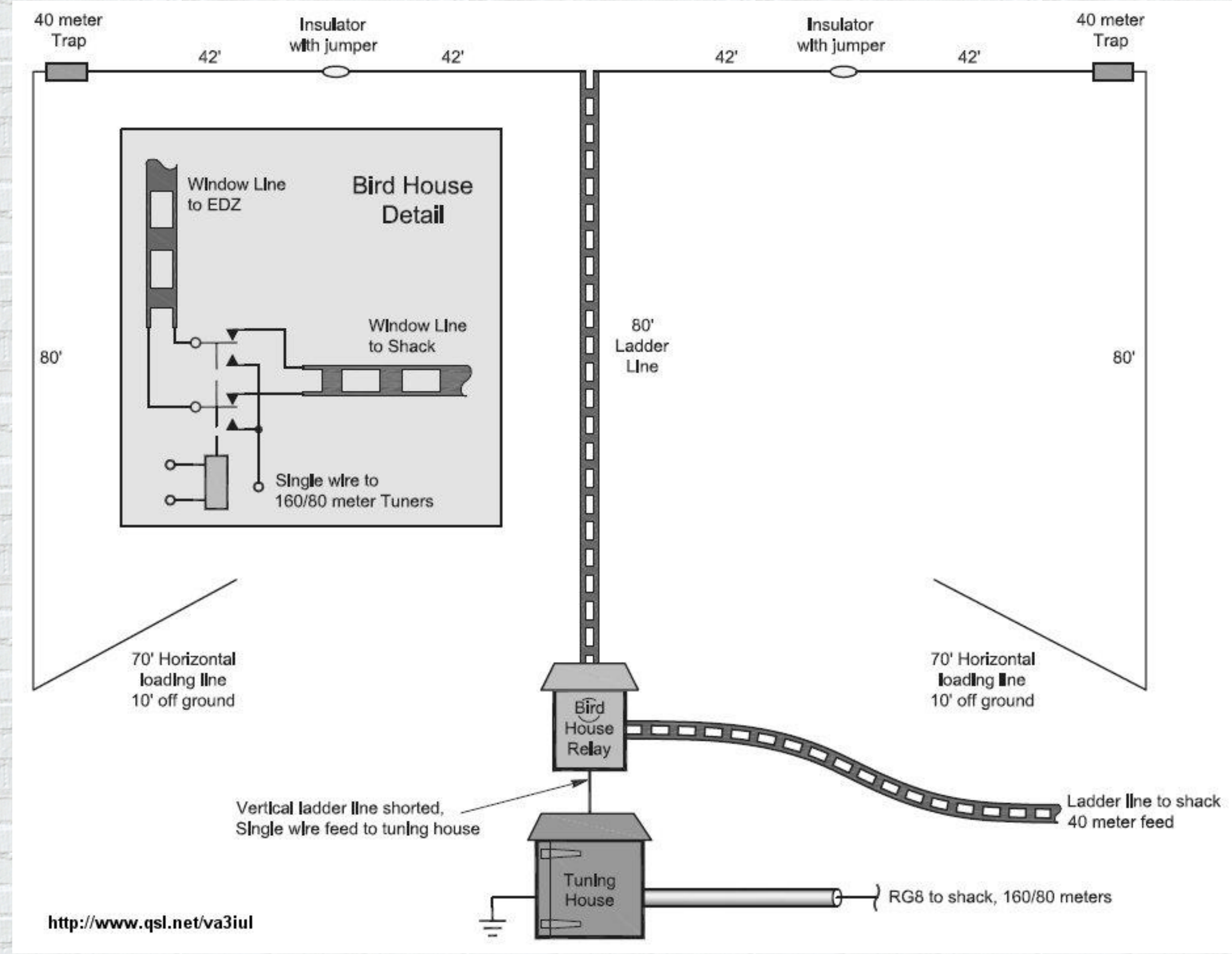
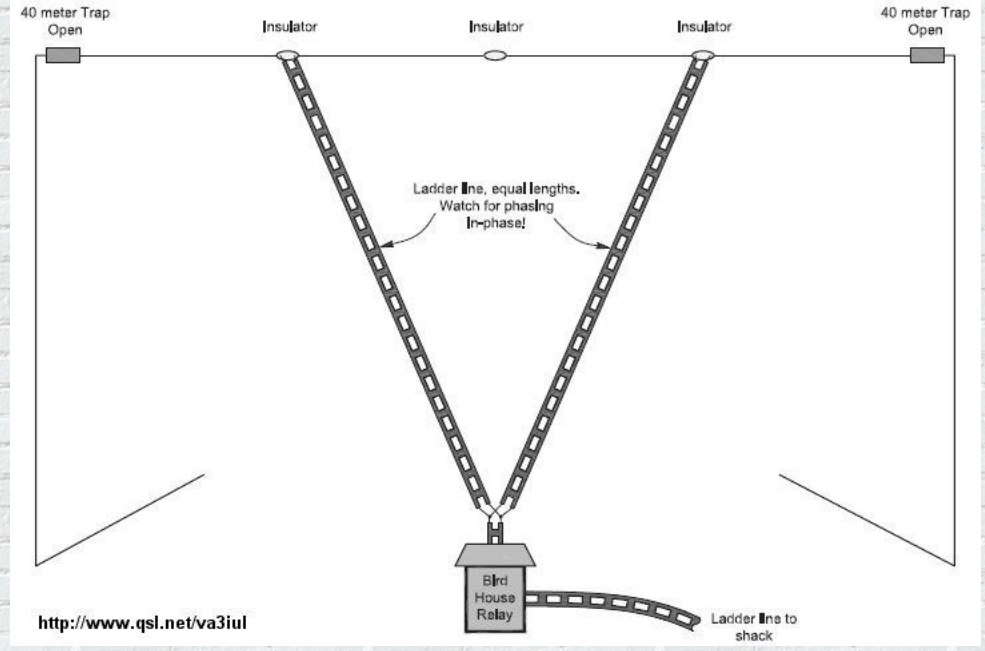
72 - Clothesline Antenna


132 ft. for Base Frequency of 80 meters (3.5 MHz). 264 ft. for 160
Midpoint
Plastic Pulley
Insulator
Wire
Plastic Pulley
(A)
(B)
300 Ω Feed Line (any length)
6 : 1 Balun
http://www.qsl.net/va3iul
Coax to Transceiver (any length)

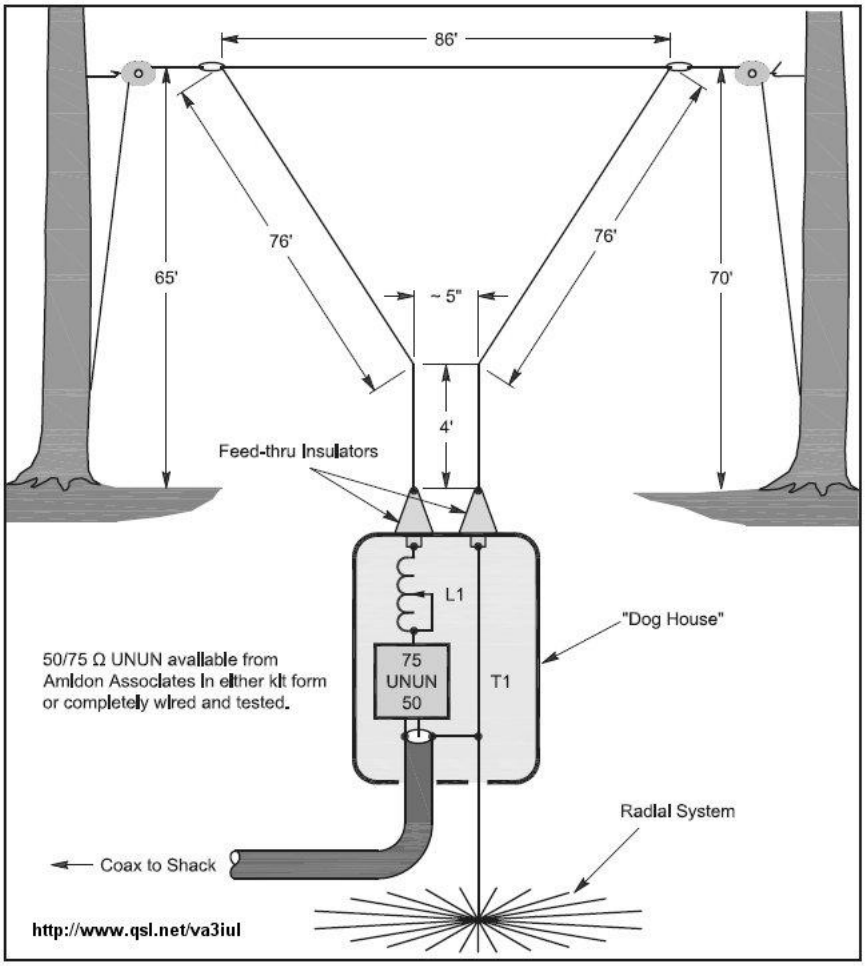
73 - Curtain Zepp Antenna for 160m, 80m, 40m


40 meter Trap
Insulator with jumper
42'
42'
42'
Insulator with jumper
42'
40 meter Trap
Window Line to EDZ
Bird House Detail
Window Line to Shack
Single wire to 160/80 meter Tuners
80'
80' Ladder Line
80'
70' Horizontal loading line 10' off ground
70' Horizontal loading line 10' off ground
Bird House Relay
Vertical ladder line shorted, Single wire feed to tuning house
Ladder line to shack 40 meter feed
Tuning House
RG8 to shack, 160/80 meters
http://www.qsl.net/va3iul

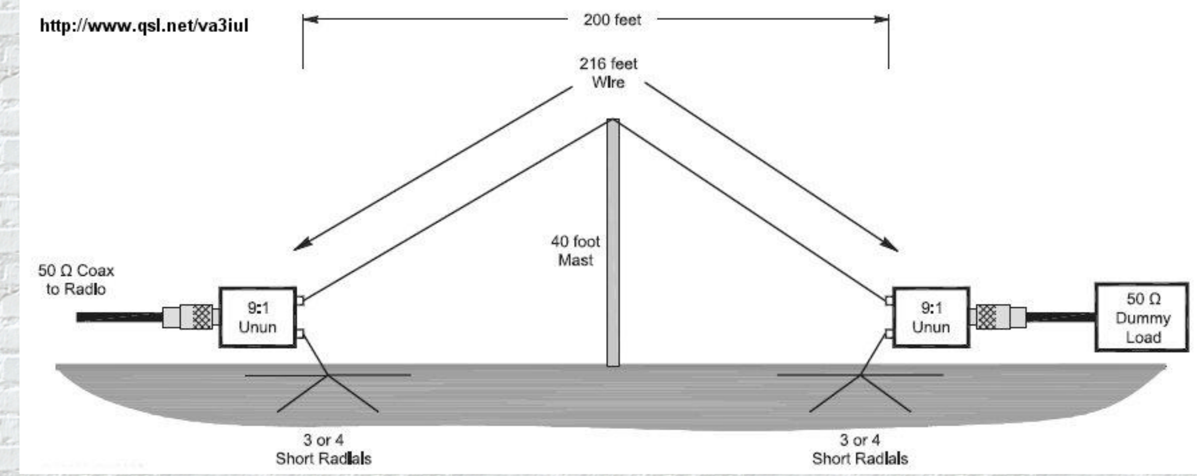
74 - Collinear Array Antenna for 40m, 30m, 20m



75 - 160m Inverted Delta Loop


86'
76'
76'
65'
70'
~ 5"
4'
Feed-thru Insulators
L1
"Dog House"
50/75 Ω UNUN available from
Amidon Associates in either kit form
or completely wired and tested.
75
UNUN
50
T1
Radial System
Coax to Shack
http://www.qsl.net/va3iul

76 - Half Rhombic Unidirectional Vertical for 20m to 6m



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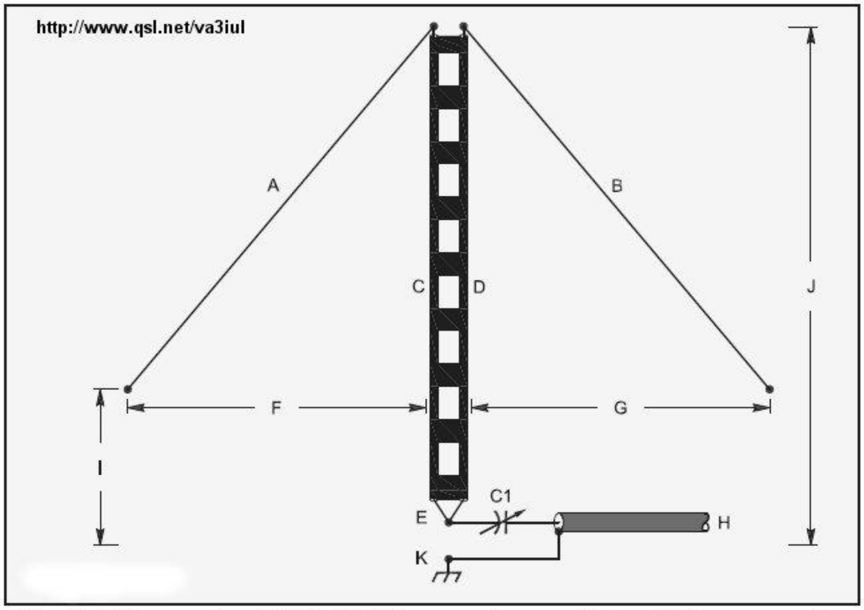
77 - Capacitance Loaded Vertical Antenna for 160m



C1 — Variable capacitor, 0-1500 pF, 7 kV.
A, B — Sloping segments of 66 foot, 4 inch pieces of #16 AWG enameled copper wire soldered to the top of segments C and D and forming a 45° angle.
C, D — 59 feet of 450 Ω open wire or window line or, alternatively, two parallel lengths of #16 AWG enameled copper wire with a 1 inch separation.
E — 1 inch triangle formed by the bottom ends of the open wire line. Solder them tightly at the vertex and connect to C1.
F, G — Distance between the lower ends of segments A and B from segments C and D, 51 feet.
H — Any length of 50 Ω coaxial cable (RG-213 in this case). The central conductor must be soldered to C1, and the braid to the ground radials.
I — Approximately 16 feet from ground to lower ends of sloping segments A and B.
J — 60 feet from antenna top to bottom.
K — Ground radials, 60 ¼ λ (the more the better — 32 will form a reasonable ground).

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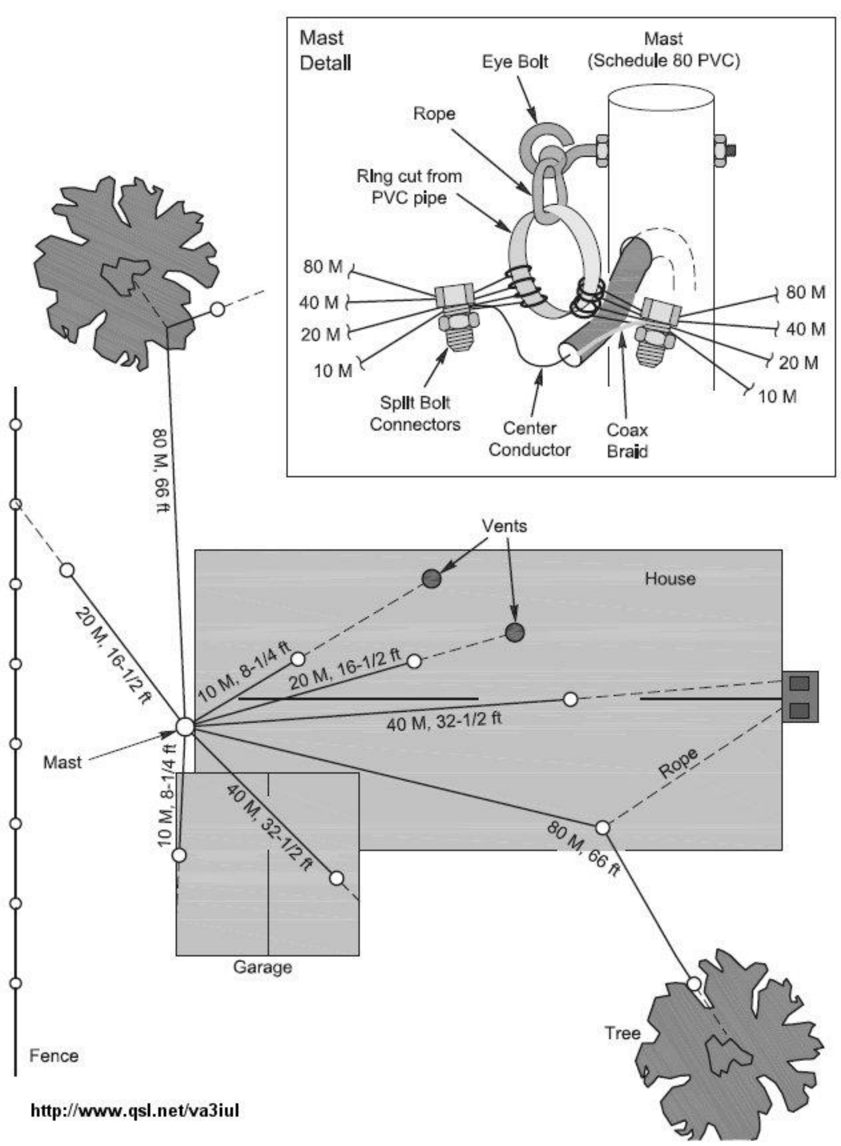
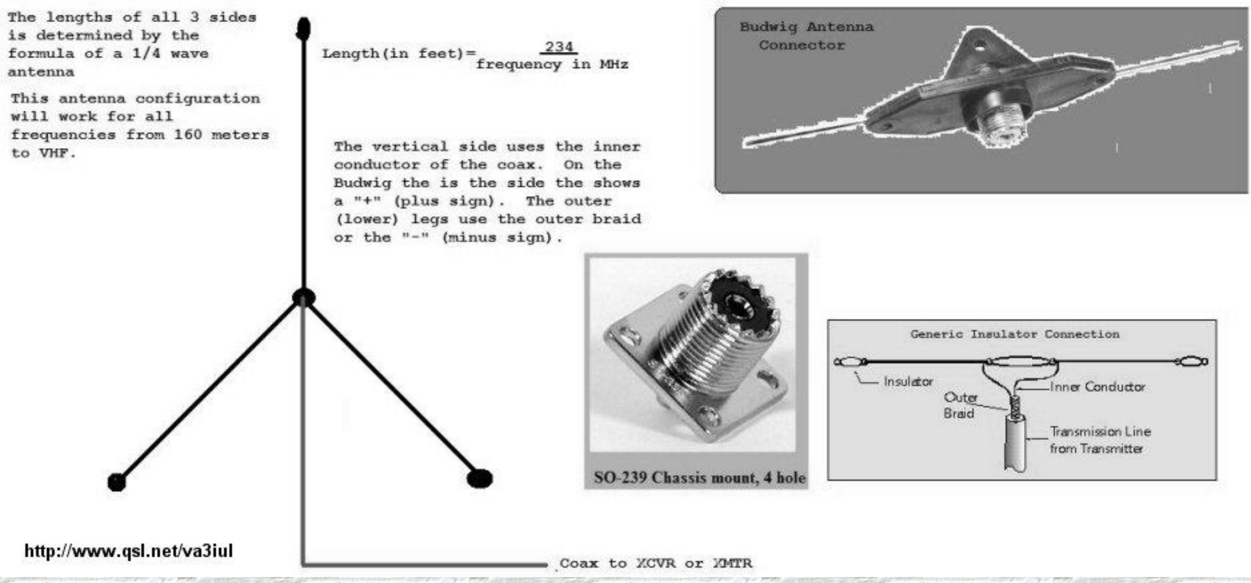
78 - Fan Dipole Antenna for 80m to 6m



http://www.qsl.net/va3iul

79 - Wire Ground Plane Antenna



The lengths of all 3 sides is determined by the formula of a 1/4 wave antenna

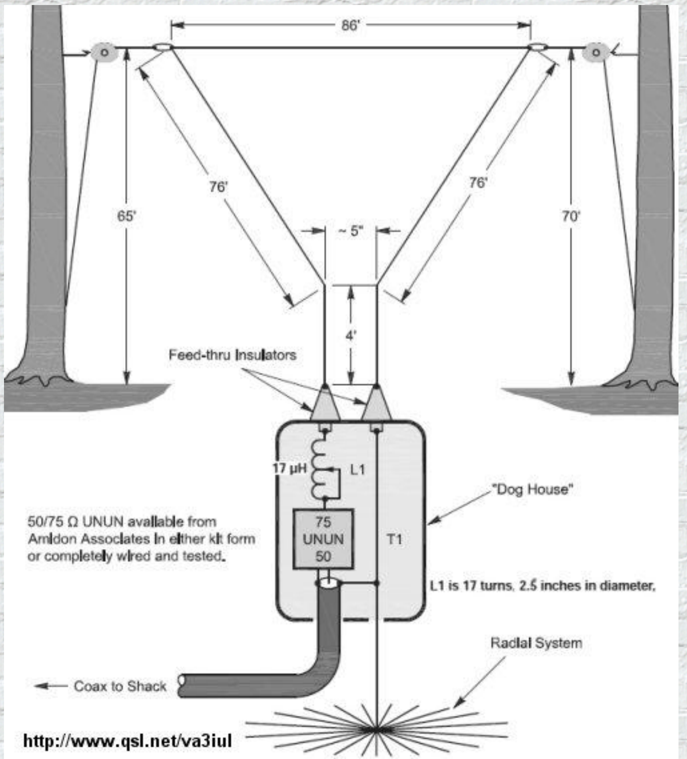
This antenna configuration will work for all frequencies from 160 meters to VHF.

$$\text{Length (in feet)} = \frac{234}{\text{frequency in MHz}}$$

The vertical side uses the inner conductor of the coax. On the Budwig the is the side the shows a "+" (plus sign). The outer (lower) legs use the outer braid or the "-" (minus sign).

http://www.qsl.net/va3iul

80 - Inverted Delta Loop Antenna for 160m


86'
76'
76'
65'
70'
~ 5"
4'
Feed-thru Insulators
17 µH
L1
"Dog House"
50/75 Ω UNUN available from Amidon Associates in either kit form or completely wired and tested.
75 UNUN 50
T1
L1 is 17 turns, 2.5 inches in diameter.
Radial System
Coax to Shack
http://www.qsl.net/va3iul

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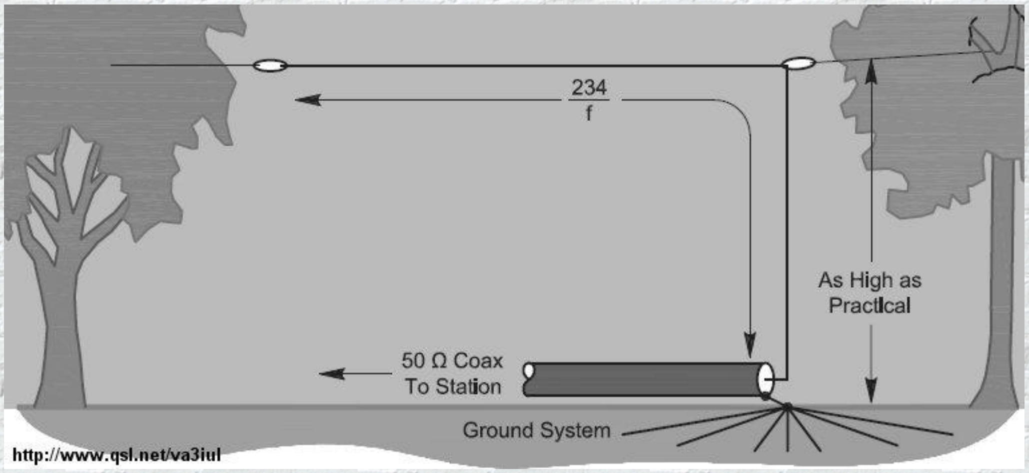
81 - Inverted-L for 160m



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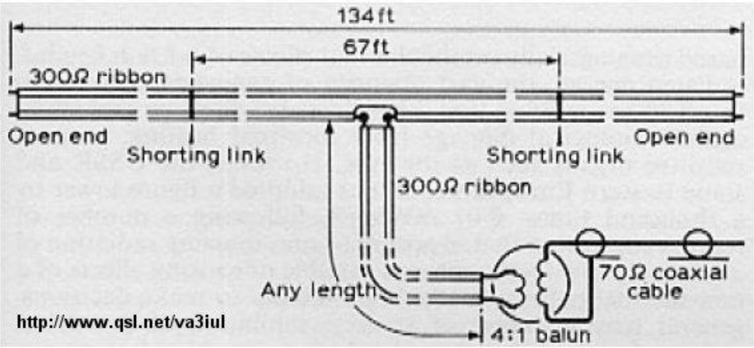
82 - 300ohm-Ribbon Dual Band Dipole



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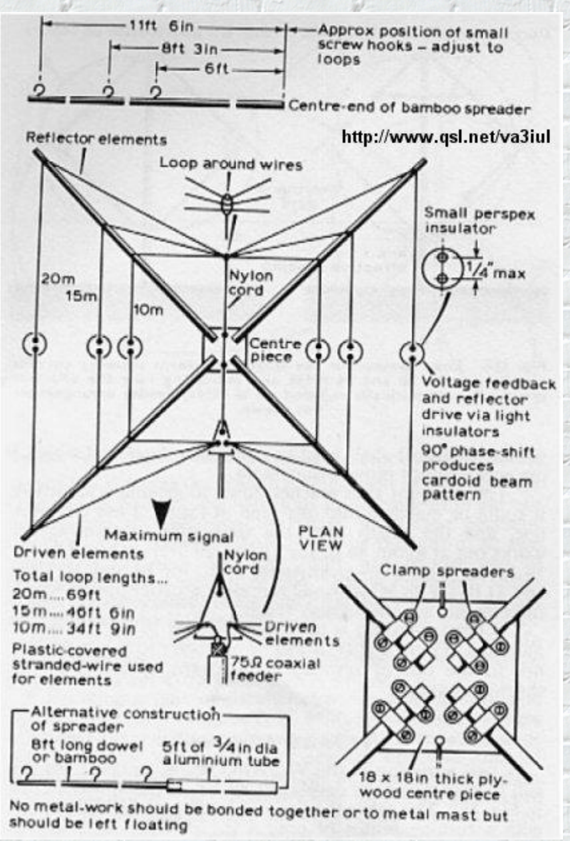
83 - Tri-Band Beam for 20m, 15m, 10m


11ft 6in
8ft 3in
6ft
Approx position of small screw hooks – adjust to loops
Centre-end of bamboo spreader
Reflector elements
http://www.qsl.net/va3iul
Loop around wires
Small perspex insulator
1/4" max
20m
15m
10m
Nylon cord
Centre piece
Voltage feedback and reflector drive via light insulators
90° phase-shift produces cardoid beam pattern
Maximum signal
PLAN VIEW
Driven elements
Nylon cord
Total loop lengths...
20m.... 69ft
15m.... 46ft 6in
10m.... 34ft 9in
Plastic-covered stranded-wire used for elements
Driven elements
75Ω coaxial feeder
Clamp spreaders
Alternative construction of spreader
8ft long dowel or bamboo
5ft of 3/4 in dia aluminium tube
18 x 18in thick ply-wood centre piece
No metal-work should be bonded together or to metal mast but should be left floating

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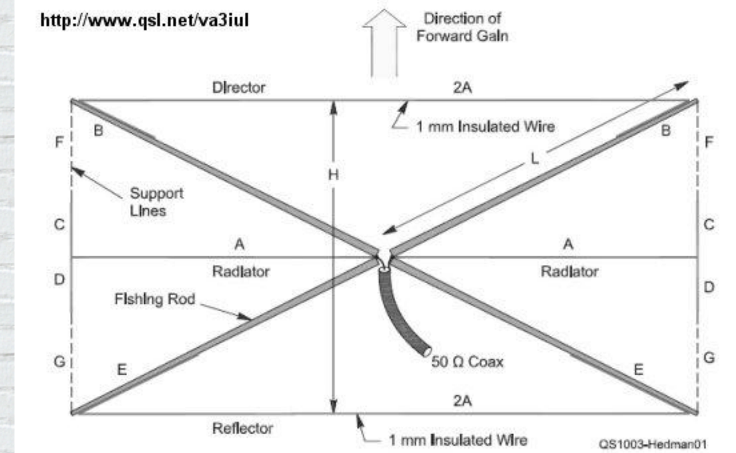
84 - Mini-Horse Yagi Antenna



MHz	A	B	C	D	E	F	G	H	L
144	1' 2.2"	0' 4.7"	0' 3.5"	0' 1.8"	0' 7.1"	0' 4.7"	0' 6.5"	1' 4.5"	1' 4.3"
28	5' 11.6"	1' 10.8"	1' 6.9"	0' 9.4"	2' 11.8"	1' 10.8"	2' 8.3"	6' 11.4"	6' 11.0"
21	7' 11.6"	2' 6.3"	2' 1.2"	1' 0.6"	3' 11.6"	2' 6.3"	3' 6.9"	9' 3.0"	9' 2.6"
14	11' 11.3"	3' 9.7"	3' 1.8"	1' 6.9"	5' 11.2"	3' 9.7"	5' 4.6"	13' 10.9"	13' 9.7"
7.1	23' 10.5"	7' 7.3"	6' 3.6"	3' 1.8"	11' 10.5"	7' 7.3"	10' 9.1"	27' 9.8"	27' 7.4"

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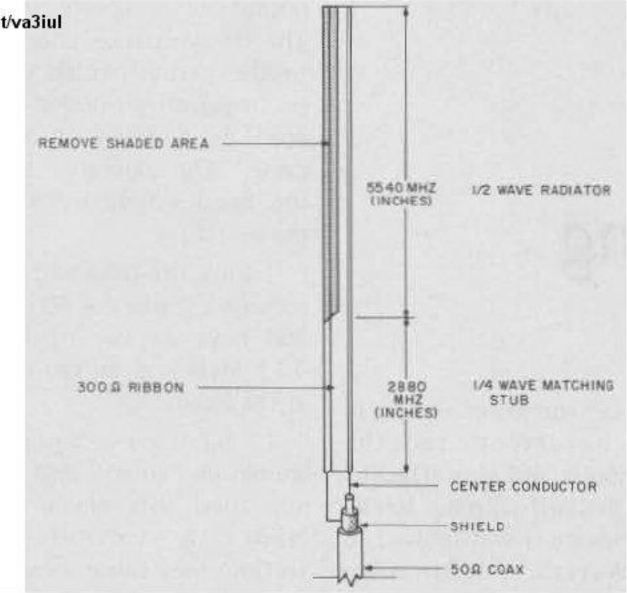
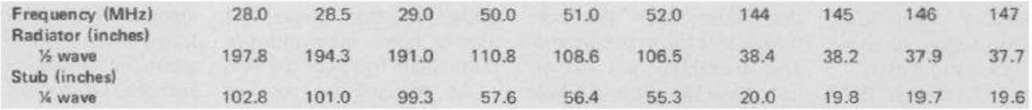
85 - Half-Rhombic Directive Antenna for 20m to 6m

http://www.qsl.net/va3iul

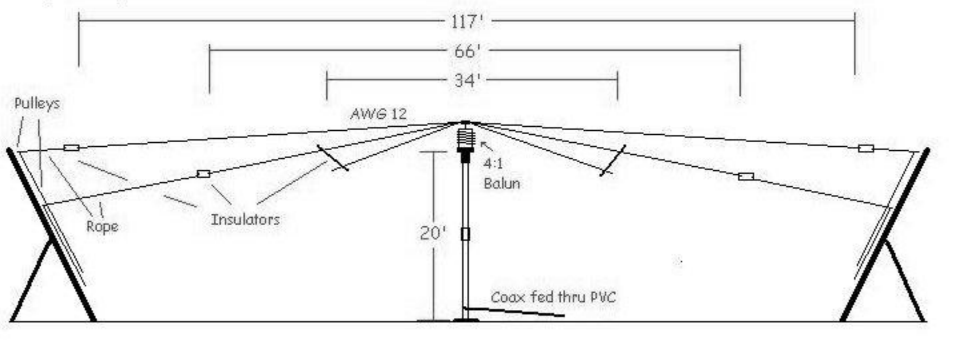




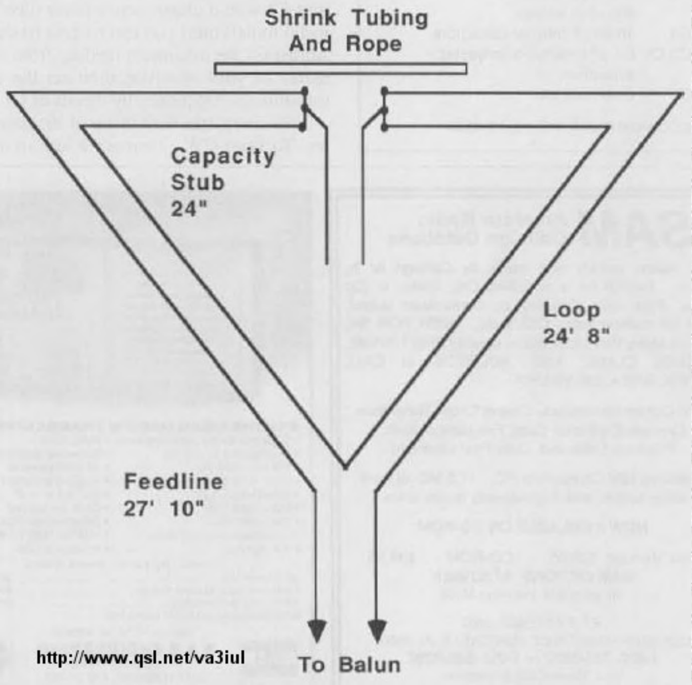
Frequency (MHz)	28.0	28.5	29.0	50.0	51.0	52.0	144	145	146	147
Radiator (inches) ½ wave	197.8	194.3	191.0	110.8	108.6	106.5	38.4	38.2	37.9	37.7
Stub (inches) ¼ wave	102.8	101.0	99.3	57.6	56.4	55.3	20.0	19.8	19.7	19.6

86 - Fan-Dipole Antenna for 80m, 40m, 20m

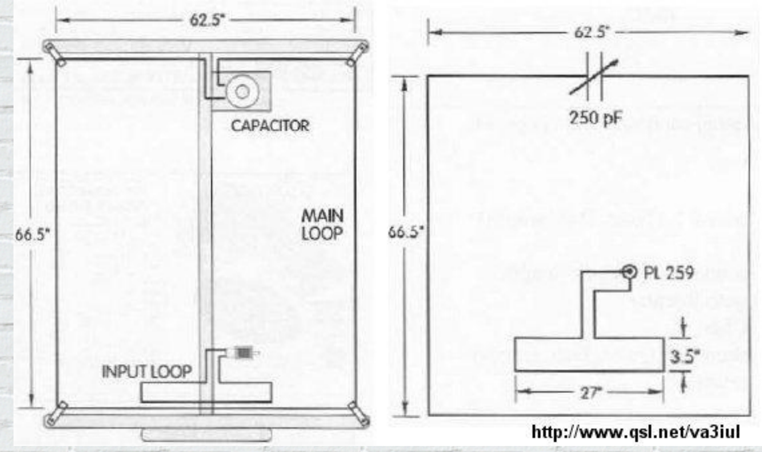
http://www.qsl.net/va3iul



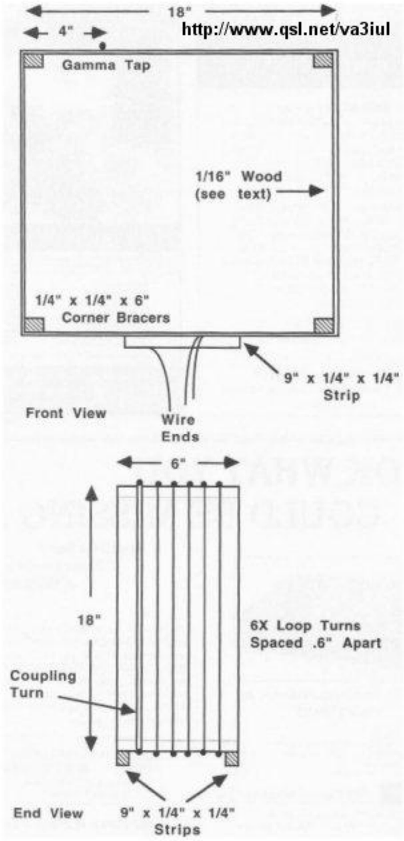
87 - Capacity Tuned Folded Loop Antenna for 20m



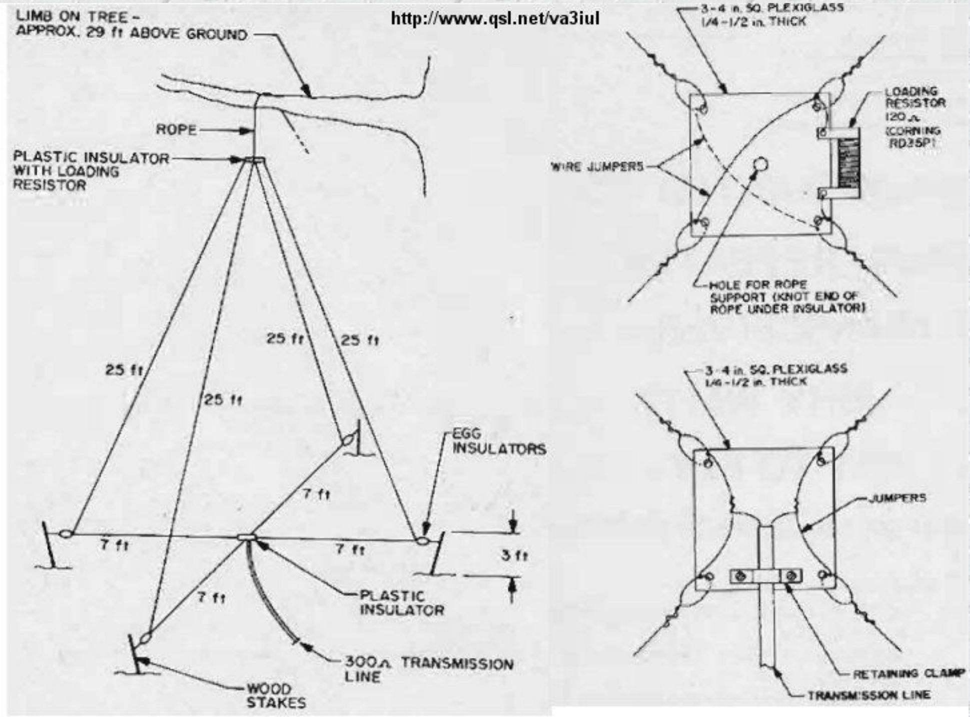
88 - Indoor Loop Antenna for 80m to 30m



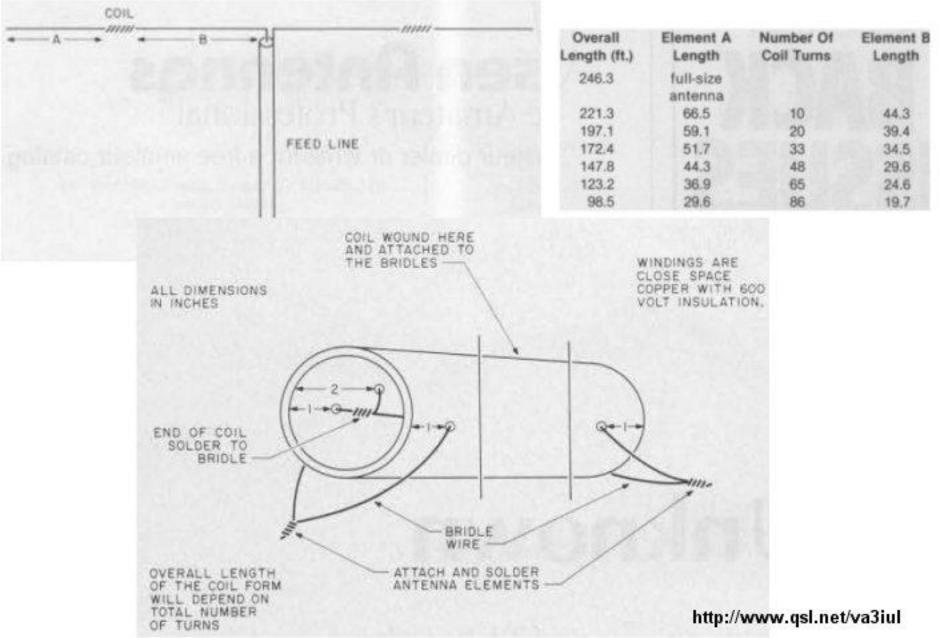
89 - Indoor Loop Antenna for 80m



90 - Double-Delta Antenna 80m and 40m

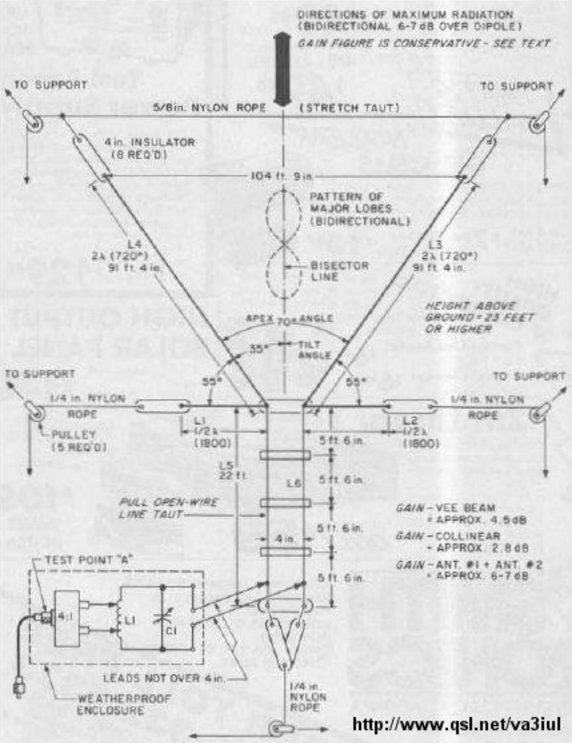


91 - Inductance-Loaded Shortened Dipole for 160m

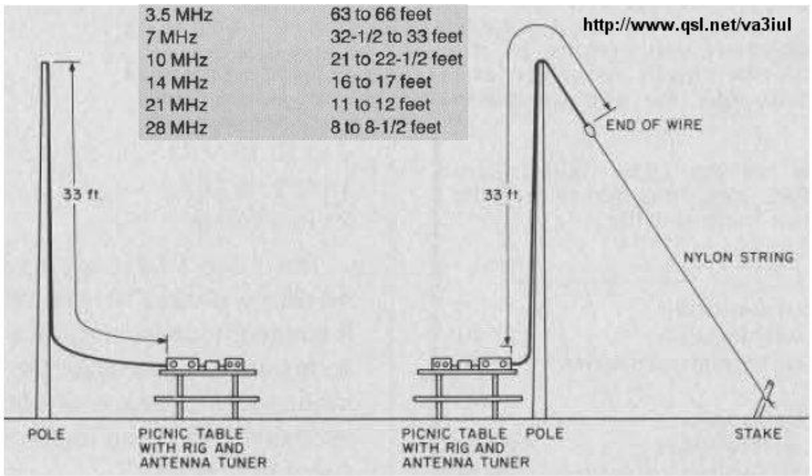

COIL
A
B
FEED LINE
COIL WOUND HERE AND ATTACHED TO THE BRIDLES
WINDINGS ARE CLOSE SPACE COPPER WITH 600 VOLT INSULATION.
ALL DIMENSIONS IN INCHES
2
1
1
1
END OF COIL SOLDER TO BRIDLE
BRIDLE WIRE
ATTACH AND SOLDER ANTENNA ELEMENTS
OVERALL LENGTH OF THE COIL FORM WILL DEPEND ON TOTAL NUMBER OF TURNS
http://www.qsl.net/va3iul

Overall Length (ft.)	Element A Length	Number Of Coil Turns	Element B Length
246.3	full-size antenna		
221.3	66.5	10	44.3
197.1	59.1	20	39.4
172.4	51.7	33	34.5
147.8	44.3	48	29.6
123.2	36.9	65	24.6
98.5	29.6	86	19.7

92 - V-Beam Antenna for 15m

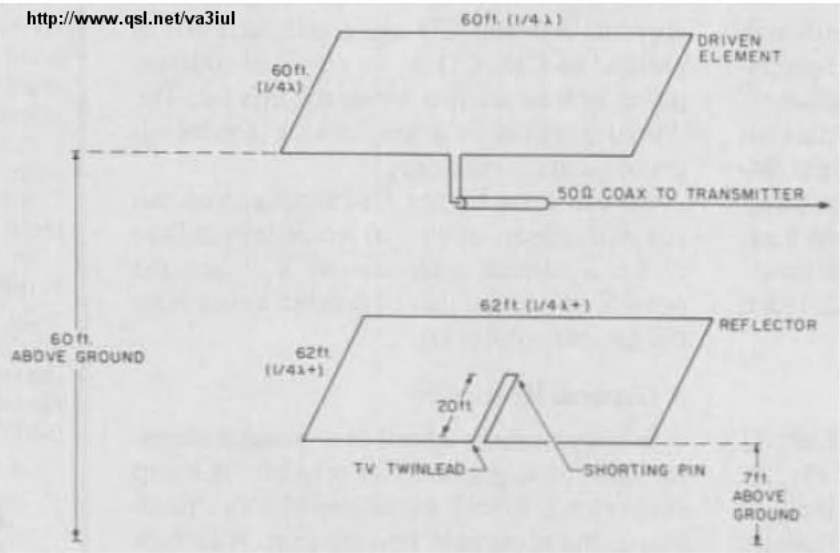

DIRECTIONS OF MAXIMUM RADIATION (BIDIRECTIONAL 6-7 dB OVER DIPOLE)
GAIN FIGURE IS CONSERVATIVE - SEE TEXT
TO SUPPORT
5/8in. NYLON ROPE (STRETCH TAUT)
TO SUPPORT
4 in. INSULATOR (8 REQ'D)
104 ft. 9 in.
PATTERN OF MAJOR LOBES (BIDIRECTIONAL)
L4 2λ (720°) 91 ft. 4 in.
BISECTOR LINE
L3 2λ (720°) 91 ft. 4 in.
HEIGHT ABOVE GROUND = 23 FEET OR HIGHER
APEX 70° ANGLE
35° TILT ANGLE
TO SUPPORT
55°
55°
TO SUPPORT
1/4 in. NYLON ROPE
1/4 in. NYLON ROPE
PULLEY (5 REQ'D)
L1 1/2λ (180°)
L2 1/2λ (180°)
5 ft. 6 in.
L5 22 ft.
L6
5 ft. 6 in.
PULL OPEN-WIRE LINE TAUT
5 ft. 6 in.
4 in.
5 ft. 6 in.
GAIN - VEE BEAM = APPROX. 4.5 dB
GAIN - COLLINEAR = APPROX. 2.8 dB
GAIN - ANT. #1 + ANT. #2 = APPROX. 6-7 dB
TEST POINT "A"
4:1
L1
C1
LEADS NOT OVER 4 in.
WEATHERPROOF ENCLOSURE
1/4 in. NYLON ROPE
http://www.qsl.net/va3iul

93 - Picnic Vertical Wire Antenna

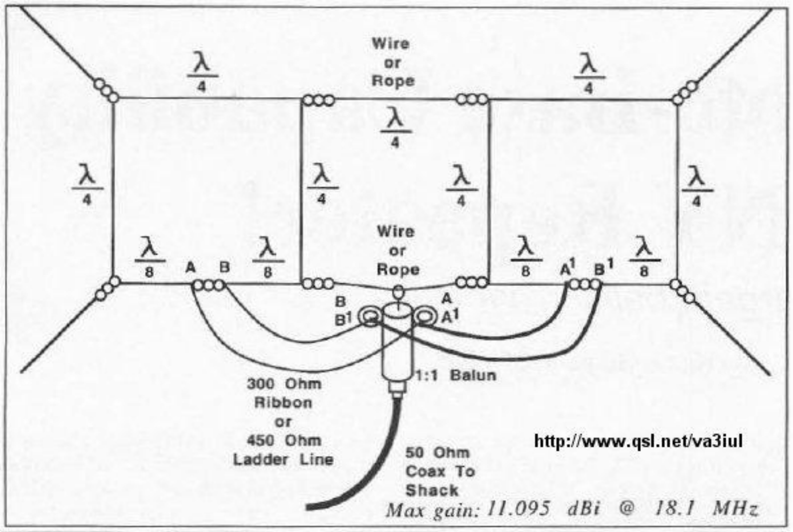

http://www.qsl.net/va3iul
33 ft.
33 ft.
END OF WIRE
NYLON STRING
POLE
PICNIC TABLE WITH RIG AND ANTENNA TUNER
PICNIC TABLE WITH RIG AND ANTENNA TUNER
POLE
STAKE

3.5 MHz	63 to 66 feet
7 MHz	32-1/2 to 33 feet
10 MHz	21 to 22-1/2 feet
14 MHz	16 to 17 feet
21 MHz	11 to 12 feet
28 MHz	8 to 8-1/2 feet

94 - Laid-Back Quad Antenna for 80m



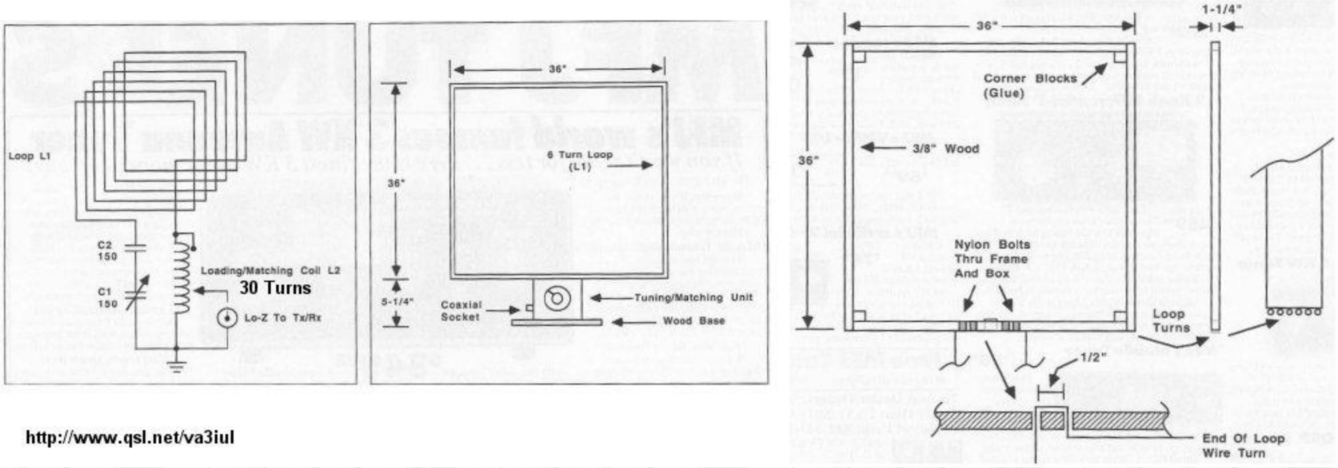
95 - Phased Loop Antenna



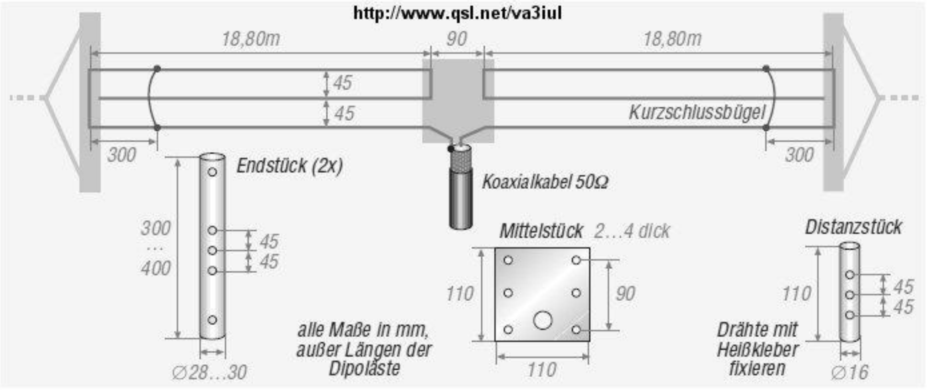
Max gain: 11.095 dBi @ 18.1 MHz

	λ/4	λ/8	300Ω Ribbon	450Ω Ladderline
40m	34.9 ft.	17.5 ft.	53.3 ft.	62.2 ft.
20m	17.6 ft.	8.8 ft.	27.0 ft.	31.2 ft.
17m	13.9 ft.	6.9 ft.	21.2 ft.	25.2 ft
15m	11.8 ft.	5.9 ft.	18.1 ft.	21.97 ft.
10m	8.67 ft.	4.33 ft.	13.2 ft.	15.33 ft.

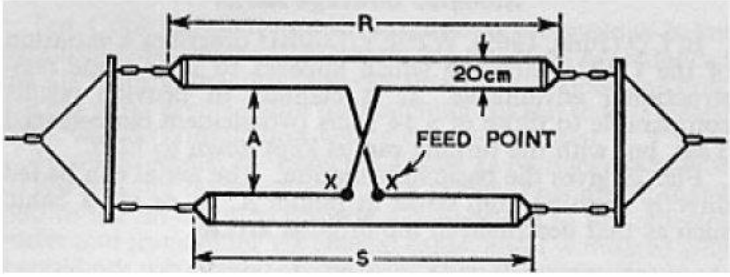
96 - Loop Antenna for TX for 160m

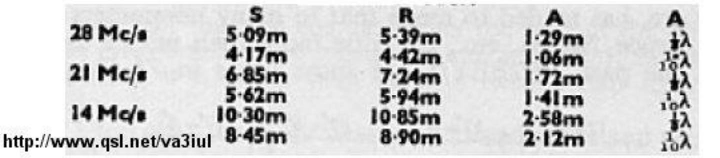


97 - Morgain-Dipole Antenna for 160m and 80m



98 - ZL-Special for 20m, 15m, 10m

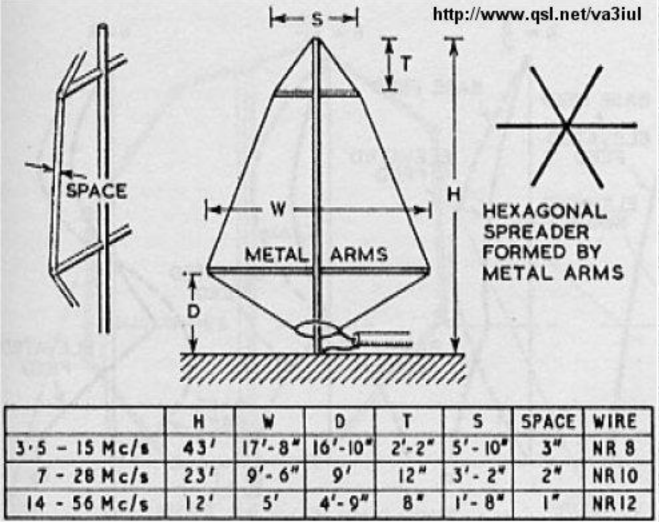




	S	R	A	A
28 Mc/s	5·09m	5·39m	1·29m	$\frac{1}{8}\lambda$
	4·17m	4·42m	1·06m	$\frac{1}{10}\lambda$
21 Mc/s	6·85m	7·24m	1·72m	$\frac{1}{8}\lambda$
	5·62m	5·94m	1·41m	$\frac{1}{10}\lambda$
14 Mc/s	10·30m	10·85m	2·58m	$\frac{1}{8}\lambda$
	8·45m	8·90m	2·12m	$\frac{1}{10}\lambda$

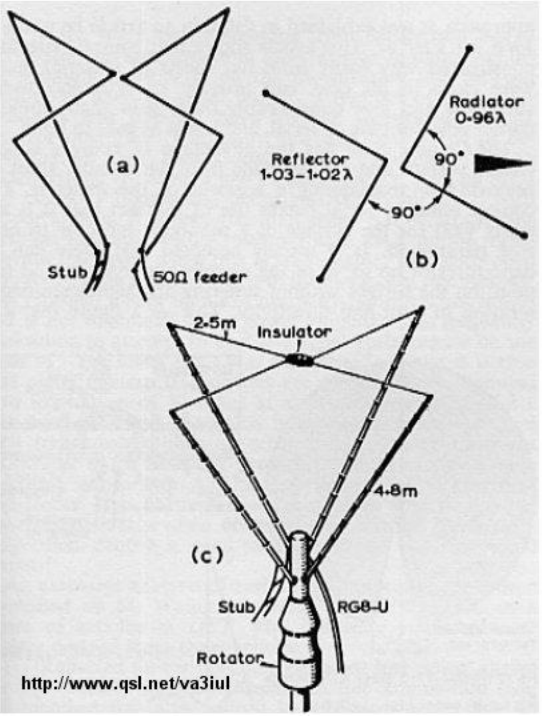
http://www.qsl.net/va3iul

99 - Biconical Antenna

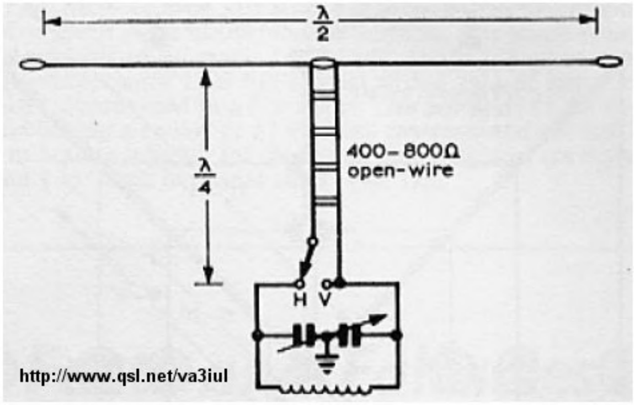

http://www.qsl.net/va3iul
S
T
SPACE
W
H
METAL ARMS
HEXAGONAL SPREADER FORMED BY METAL ARMS
D

	H	W	D	T	S	SPACE	WIRE
3·5 – 15 Mc/s	43′	17′-8″	16′-10″	2′-2″	5′-10″	3″	NR 8
7 - 28 Mc/s	23′	9′-6″	9′	12″	3′-2″	2″	NR 10
14 - 56 Mc/s	12′	5′	4′-9″	8″	1′-8″	1″	NR 12

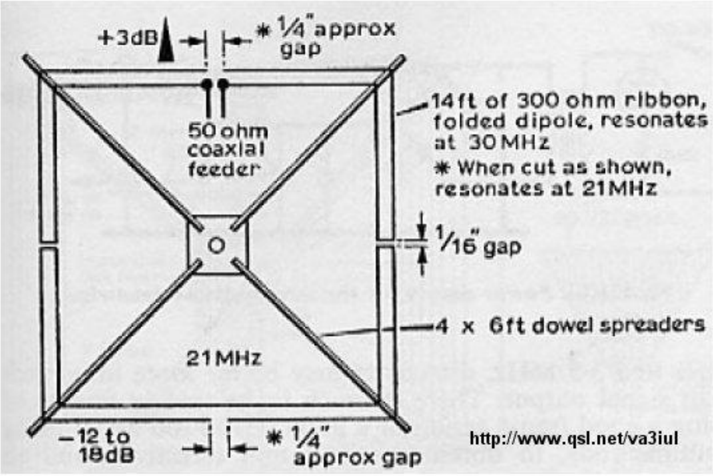
100 - Directive Delta-Birdcage Antenna for 20m to 10m



101 - Dual Polarization Antenna for 80m and 40m



102 - Directive 300-ohm-Ribbon Folded Dipole for 15m


+3dB
* 1/4" approx gap
50 ohm coaxial feeder
14 ft of 300 ohm ribbon, folded dipole, resonates at 30 MHz
* When cut as shown, resonates at 21MHz
1/16" gap
4 x 6ft dowel spreaders
21MHz
-12 to 18dB
* 1/4" approx gap
http://www.qsl.net/va3iul

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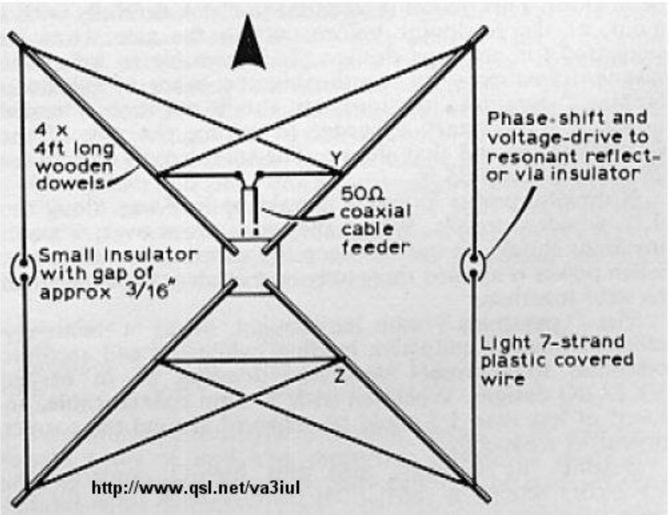
103 - Miniature Directive Antenna for 10m


4 x 4ft long wooden dowels
Y
50Ω coaxial cable feeder
Phase-shift and voltage-drive to resonant reflector via insulator
Small insulator with gap of approx 3/16"
Z
Light 7-strand plastic covered wire
http://www.qsl.net/va3iul

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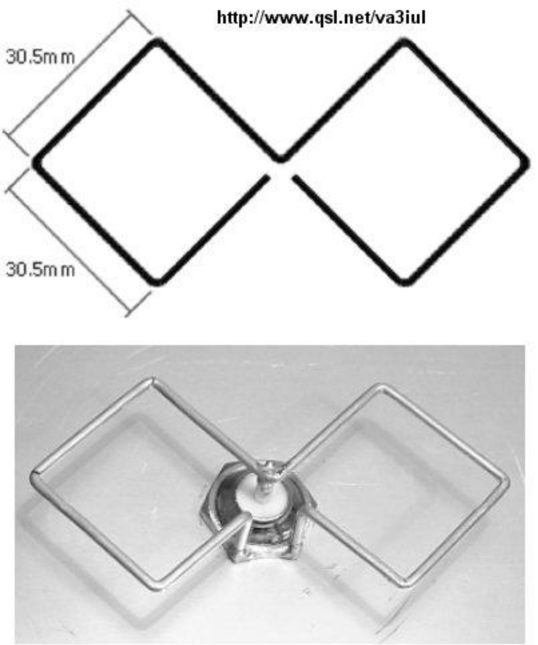
104 - Biquad Antenna 12dBi-Gain for 2.4GHz



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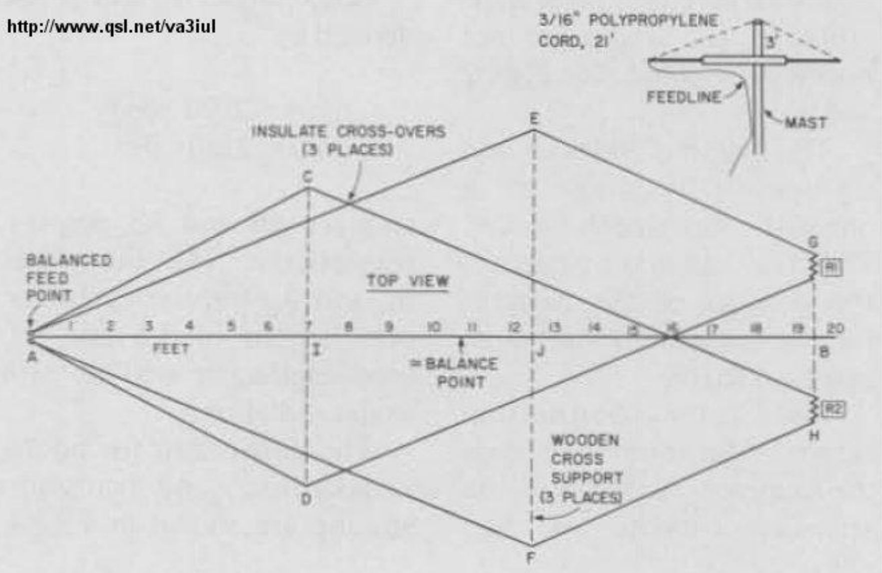
105 - Dual-Rhomboid Antenna for 435MHz to 870MHz



Dual rhomboid antenna for 435-870 MHz. Beamwidth ≈ 10° H x 6° V. Gain over DP ≈ 26 dB. Boom length: AB = 19'6". Support spacing : AI = 7'; IJ = 5'6"; JB = 7'. Support length: CD = 7'3"; EF = 10'3"; GH = 3'0". Rhomboid sides: AC, AD, EG, FH = 7'9.5"; AE, AF, CH, DG = 13'5.5". Feedline: Wire needed: 14 AWG formvar, ≈ 86'0". Boom material: AI, JB = wood; IJ = metal. Cross support: CD, EF, GH = wood. Terminators: R1, R2 = 600 Ohms; Watts

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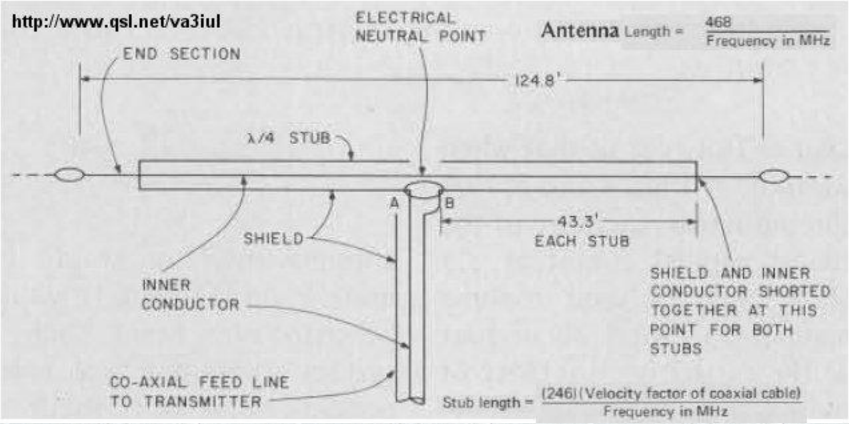
106 - Double-Bazooka Antenna for 80m


http://www.qsl.net/va3iul
ELECTRICAL NEUTRAL POINT
Antenna Length = 468 / Frequency in MHz
END SECTION
124.8'
λ/4 STUB
A
B
43.3' EACH STUB
SHIELD
INNER CONDUCTOR
SHIELD AND INNER CONDUCTOR SHORTED TOGETHER AT THIS POINT FOR BOTH STUBS
CO-AXIAL FEED LINE TO TRANSMITTER
Stub length = (246)(Velocity factor of coaxial cable) / Frequency in MHz

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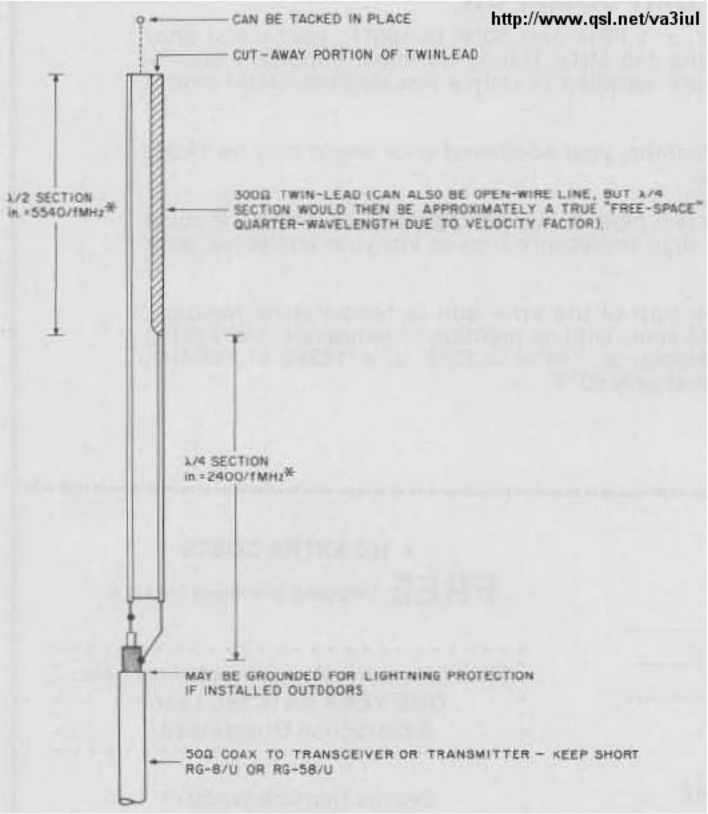
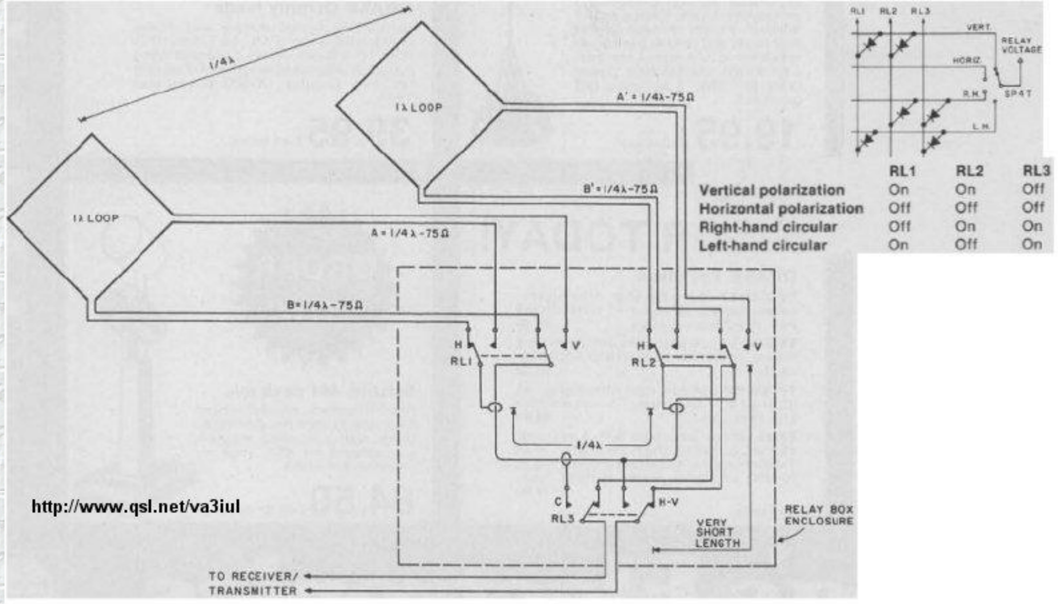
107 - J-Style Antenna

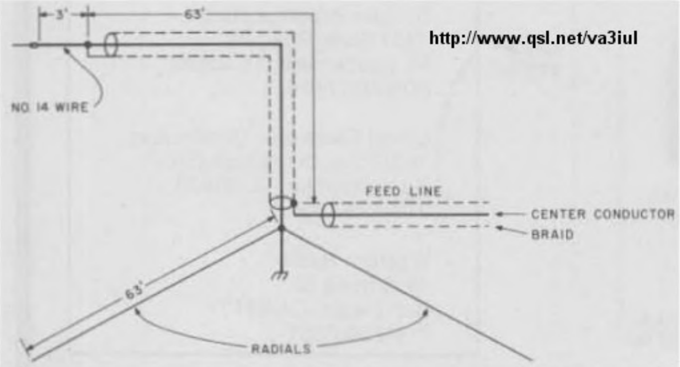

http://www.qsl.net/va3iul
CAN BE TACKED IN PLACE
CUT-AWAY PORTION OF TWINLEAD
λ/2 SECTION
in.=5540/fMHz*
300Ω TWIN-LEAD (CAN ALSO BE OPEN-WIRE LINE, BUT λ/4 SECTION WOULD THEN BE APPROXIMATELY A TRUE "FREE-SPACE" QUARTER-WAVELENGTH DUE TO VELOCITY FACTOR).
λ/4 SECTION
in.=2400/fMHz*
MAY BE GROUNDED FOR LIGHTNING PROTECTION IF INSTALLED OUTDOORS
50Ω COAX TO TRANSCEIVER OR TRANSMITTER – KEEP SHORT RG-8/U OR RG-58/U

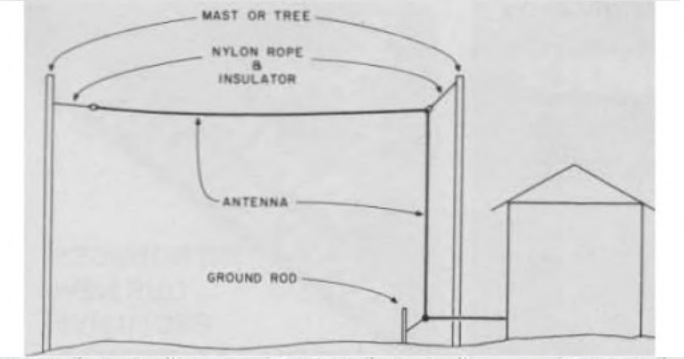
108 - Vertical / Horizontal / Circular Polarization Antenna



	RL1	RL2	RL3
Vertical polarization	On	On	Off
Horizontal polarization	Off	Off	Off
Right-hand circular	Off	On	On
Left-hand circular	On	Off	On

109 - Coax Inverted-L Antenna for 80m





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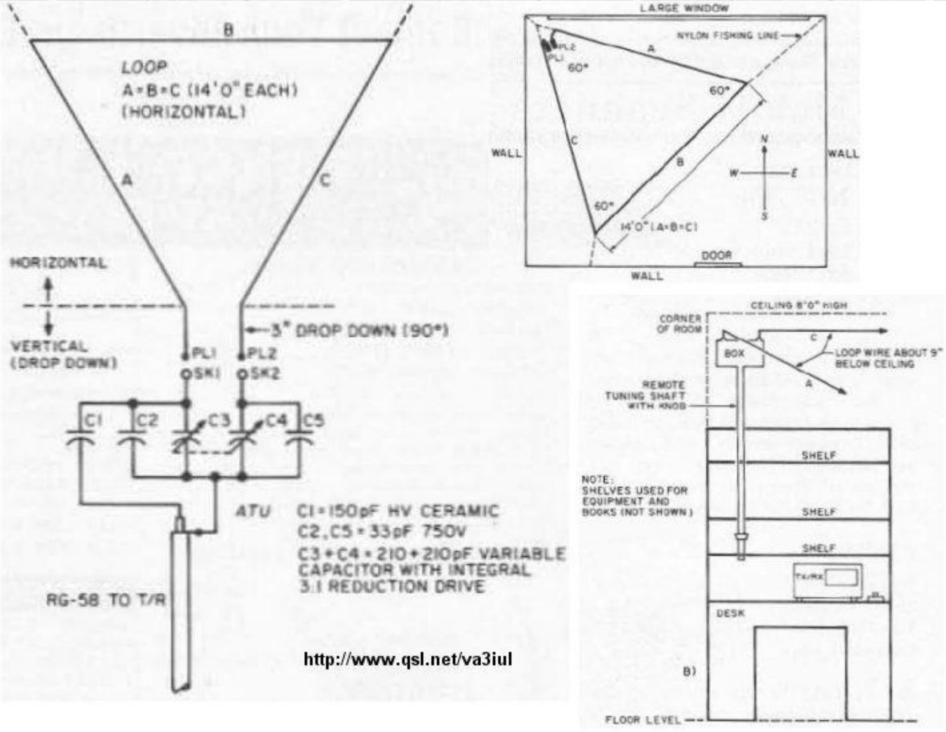
110 - Indoor Compact Loop Antenna for 80m



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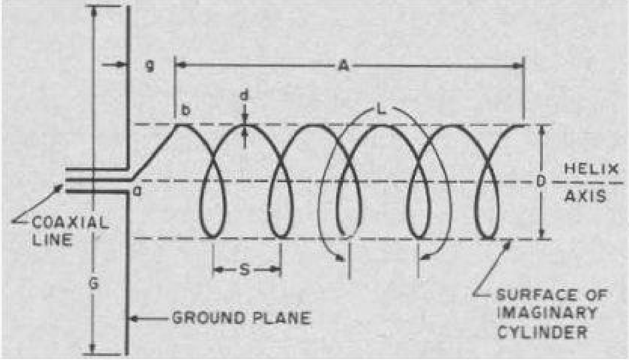
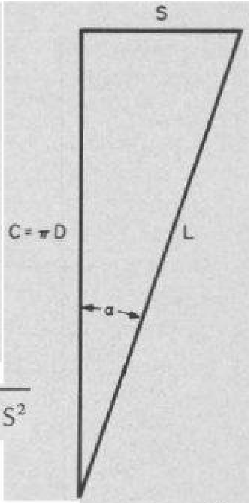
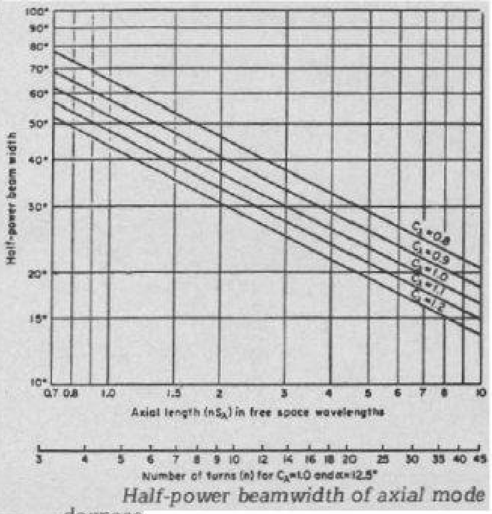
111 - Helix Antenna







Half-power beamwidth of axial mode

D = Diameter of the helix
S = Spacing between turns
α = Pitch angle = Arctan $\left(\frac{S}{\pi D}\right)$
L = Length of 1 turn
n = Number of turns
A = Axial length = nS
d = Diameter of conductor
g = Distance of ground plane to first turn
G = Ground plane diameter

$$L = \sqrt{(\pi D)^2 + S^2}$$

$D = 0.32\lambda$

$S = 0.22\lambda$

$G \geqslant 0.80\lambda$

$$g = \frac{S}{2} = 0.12\lambda$$

$$\beta = \frac{52}{C_\lambda \sqrt{nS_\lambda}} \text{ degrees}$$

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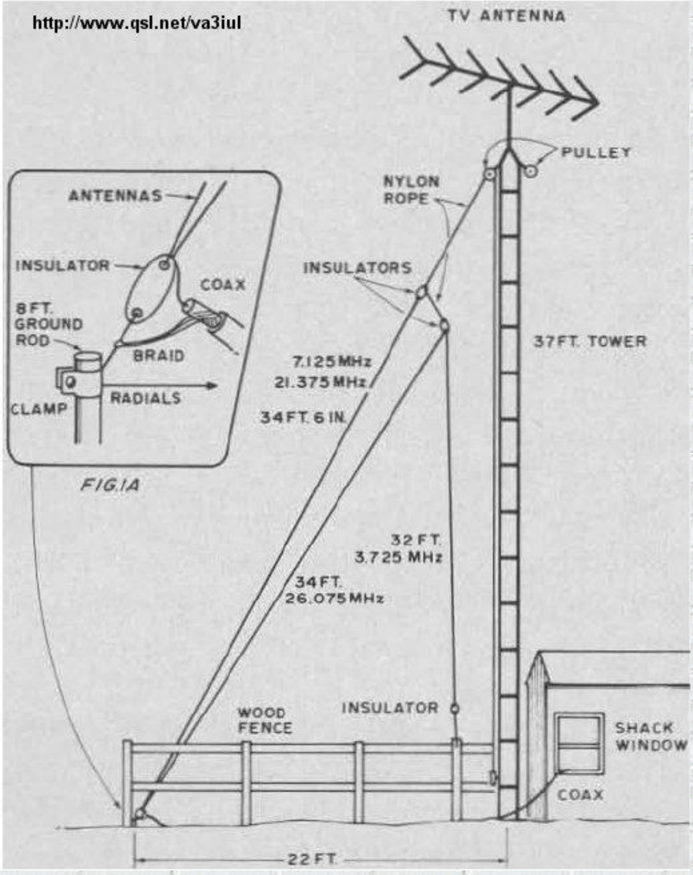
112 - Novice Vertical Antenna for 80m, 40m, 15m, 10m



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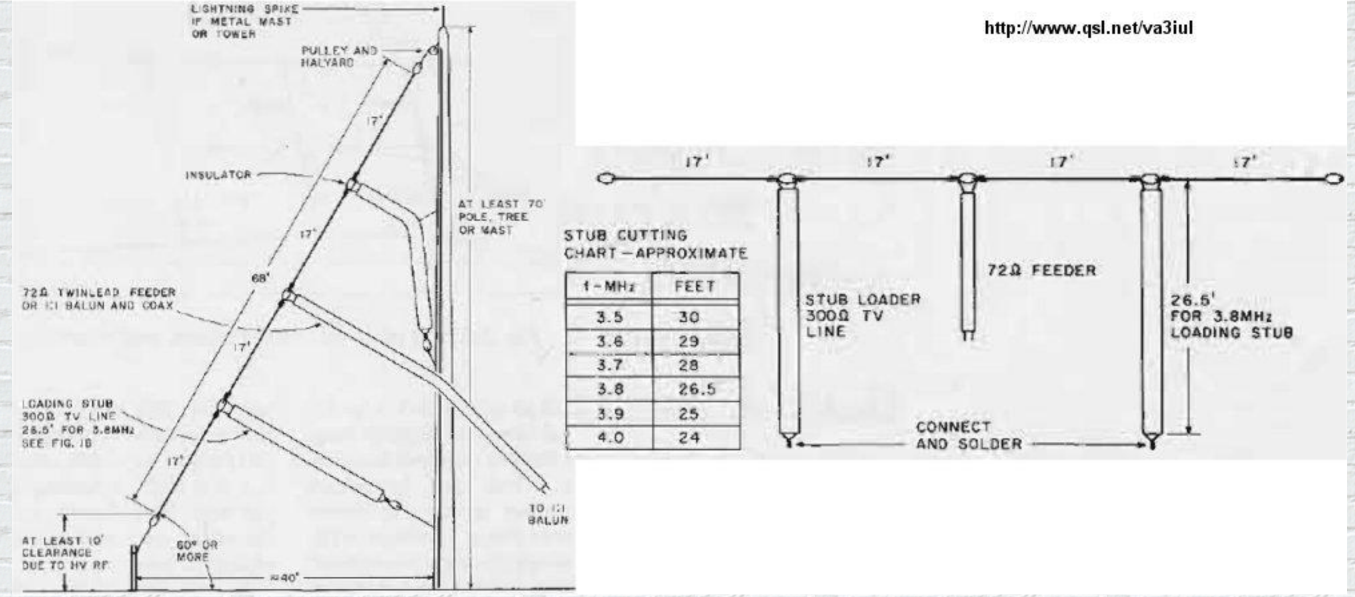
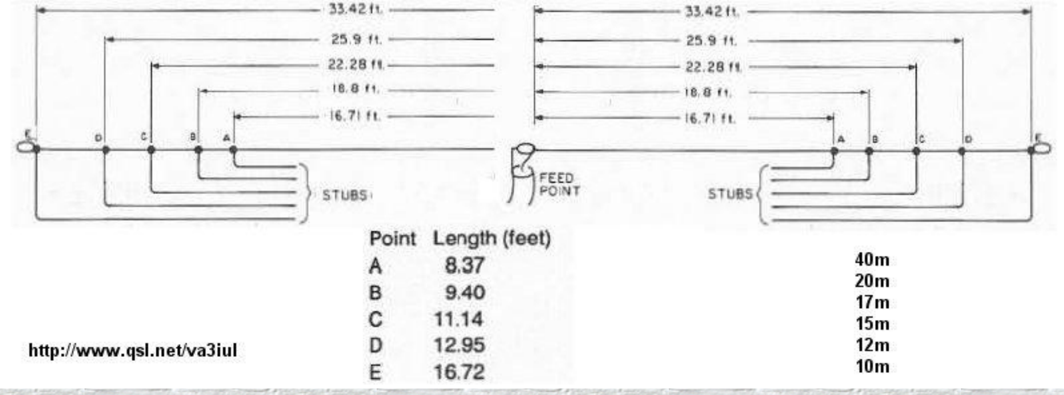
113 - Stub-Loaded Shortened Dipole for 80m



STUB CUTTING
CHART – APPROXIMATE

f – MHz	FEET
3.5	30
3.6	29
3.7	28
3.8	26.5
3.9	25
4.0	24

114 - Six-Band Wire-Stub Trap Antenna for 40m-10m



Point	Length (feet)
A	8.37
B	9.40
C	11.14
D	12.95
E	16.72

40m
20m
17m
15m
12m
10m

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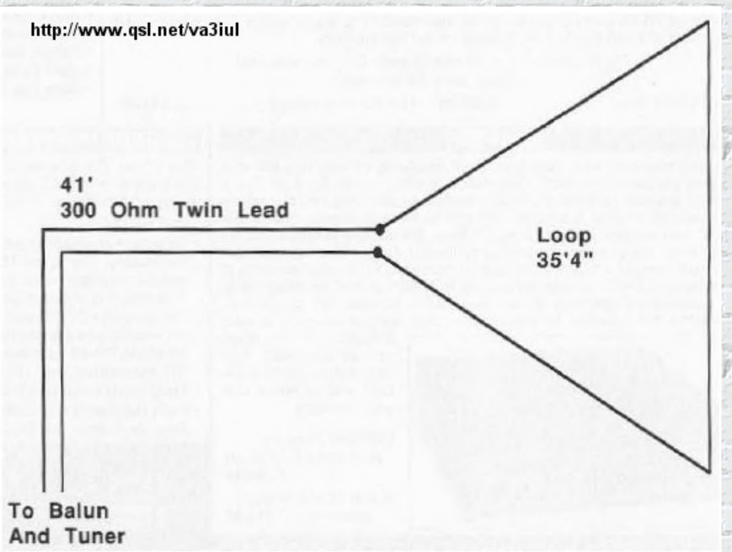
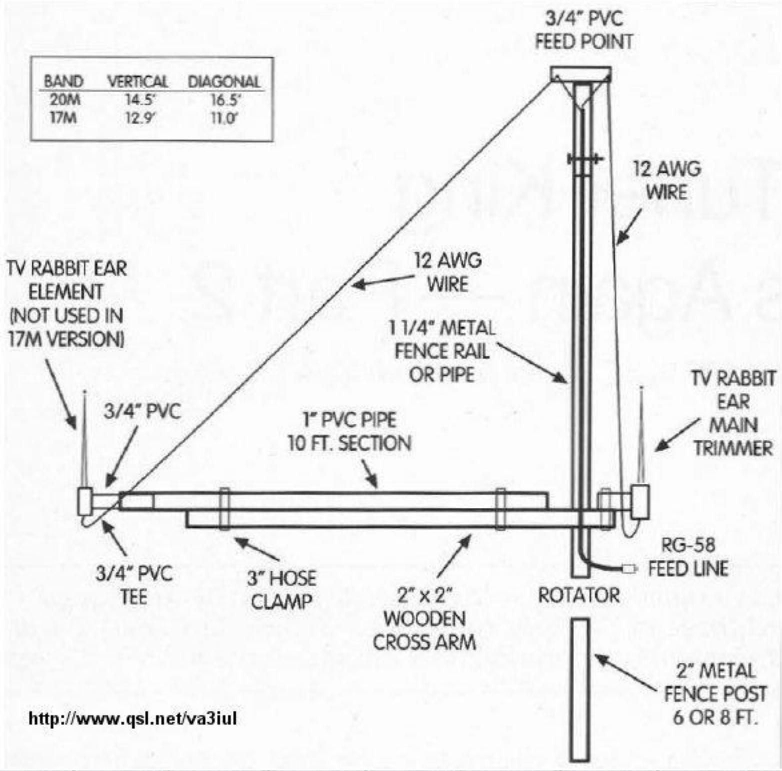
115 - Multiband Half-Wave Delta-Loop Antenna



116 - Hybrid Vee for 20m, 17m



BAND	VERTICAL	DIAGONAL
20M	14.5'	16.5'
17M	12.9'	11.0'

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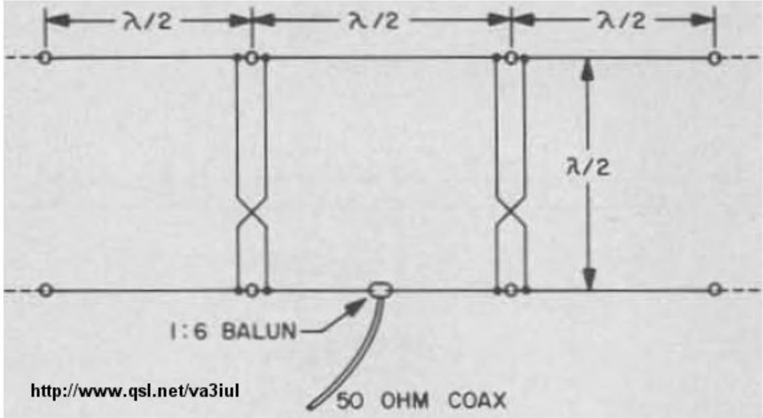
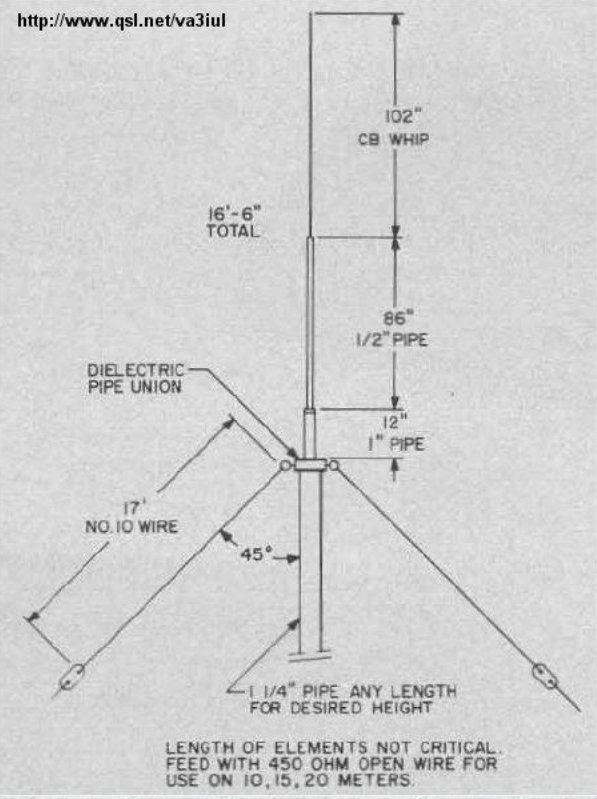
117 - Six-Shooter Array Antenna, Gain=7.5dB



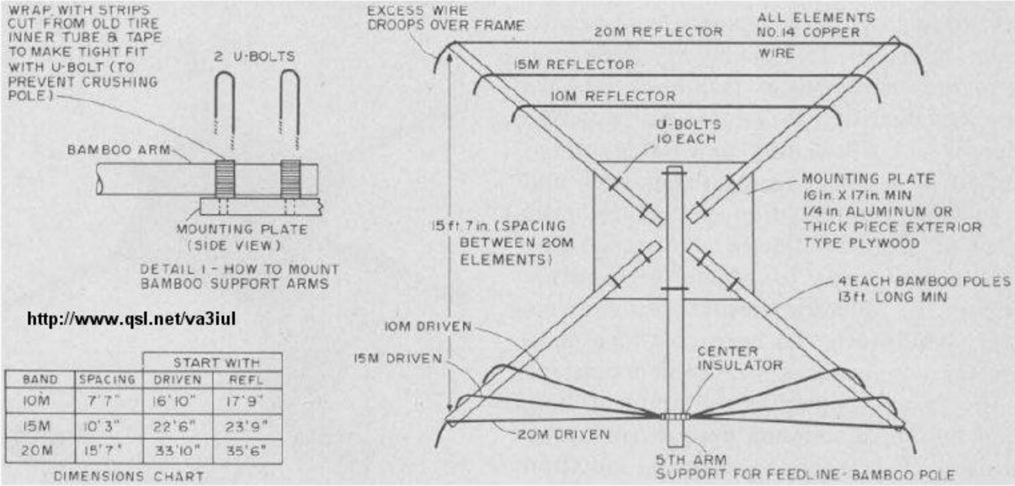
http://www.qsl.net/va3iul

118 - Multiband Ground-Plane Antenna for 10m, 15m, 20m



LENGTH OF ELEMENTS NOT CRITICAL.
FEED WITH 450 OHM OPEN WIRE FOR
USE ON 10, 15, 20 METERS.

119 - Wire Superbeam Antenna for 10m, 15m, 20m

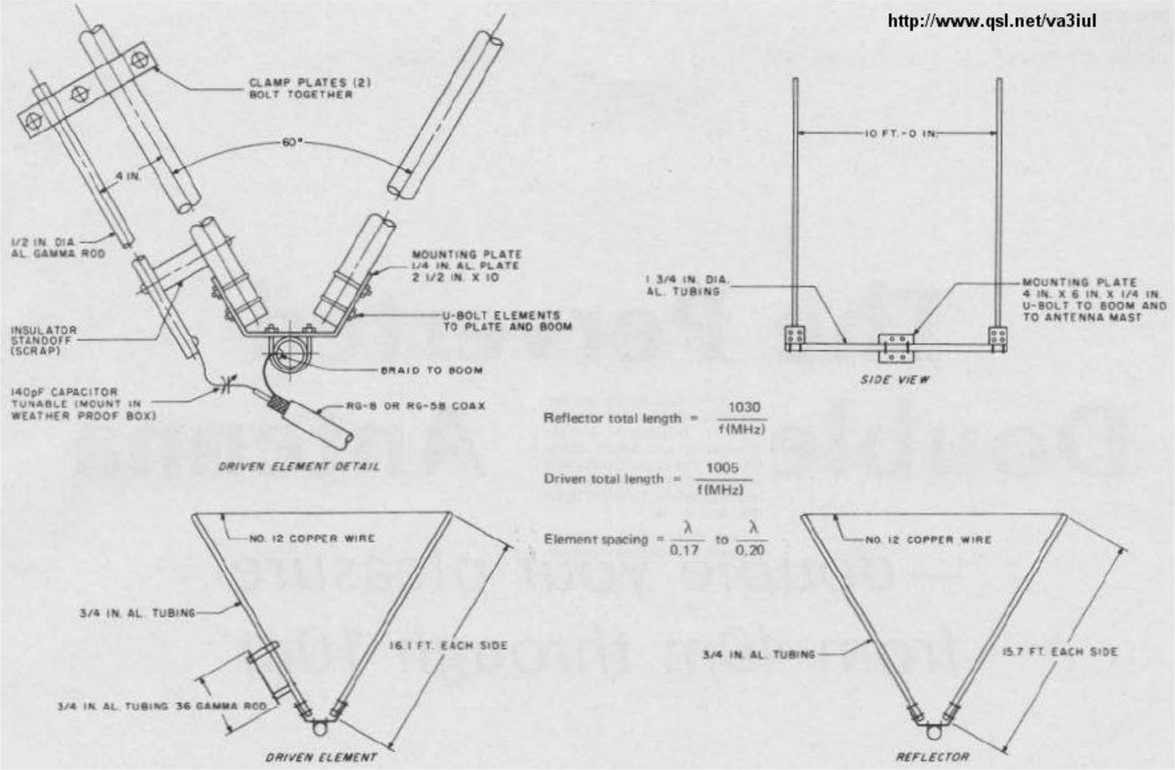


DETAIL 1 - HOW TO MOUNT
BAMBOO SUPPORT ARMS

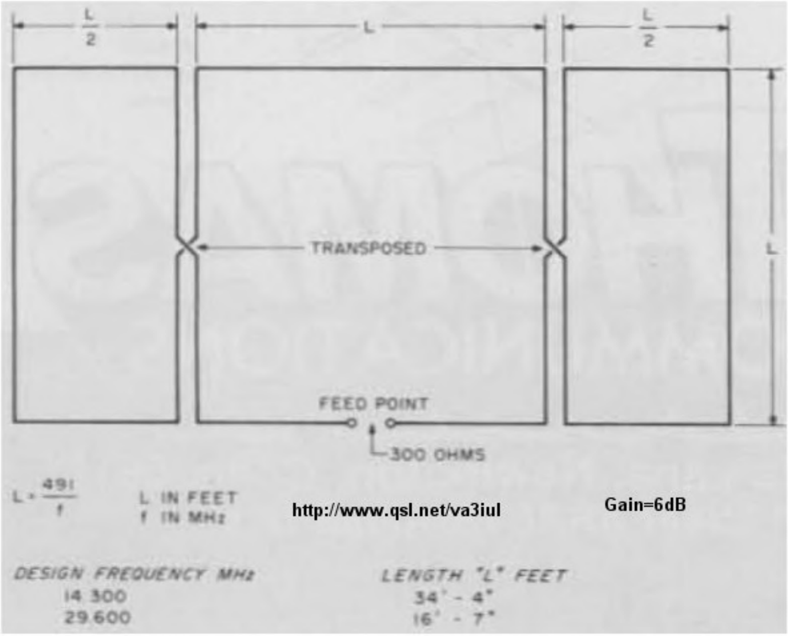
		START WITH	
BAND	SPACING	DRIVEN	REFL
10M	7'7"	16'10"	17'9"
15M	10'3"	22'6"	23'9"
20M	15'7"	33'10"	35'6"

DIMENSIONS CHART

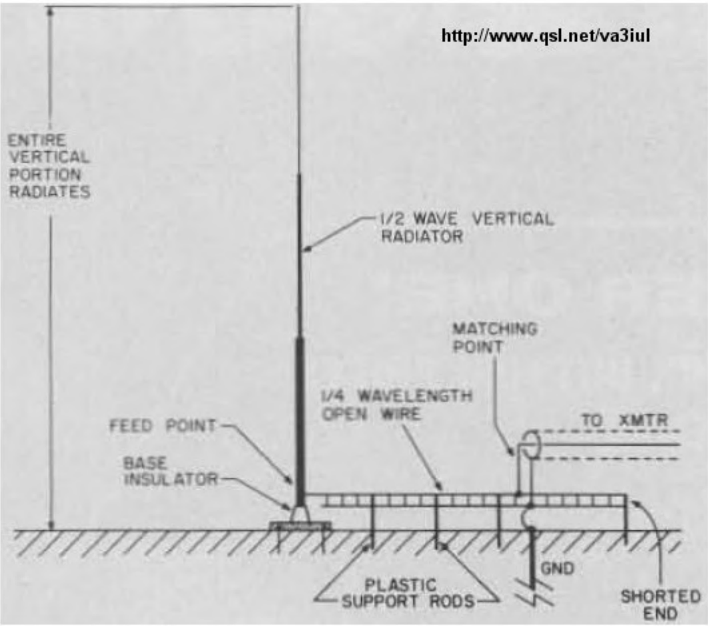
120 - Two Elements Delta-Loop Antenna


http://www.qsl.net/va3iul
CLAMP PLATES (2) BOLT TOGETHER
60°
4 IN.
1/2 IN. DIA AL. GAMMA ROD
MOUNTING PLATE 1/4 IN. AL. PLATE 2 1/2 IN. X 10
U-BOLT ELEMENTS TO PLATE AND BOOM
INSULATOR STANDOFF (SCRAP)
BRAID TO BOOM
140pF CAPACITOR TUNABLE (MOUNT IN WEATHER PROOF BOX)
RG-8 OR RG-58 COAX
DRIVEN ELEMENT DETAIL
10 FT.-0 IN.
1 3/4 IN. DIA. AL. TUBING
MOUNTING PLATE 4 IN. X 6 IN. X 1/4 IN. U-BOLT TO BOOM AND TO ANTENNA MAST
SIDE VIEW
Reflector total length = 1030 / f(MHz)
Driven total length = 1005 / f(MHz)
Element spacing = λ / 0.17 to λ / 0.20
NO. 12 COPPER WIRE
3/4 IN. AL. TUBING
16.1 FT. EACH SIDE
3/4 IN. AL. TUBING 36 GAMMA ROD
DRIVEN ELEMENT
NO. 12 COPPER WIRE
3/4 IN. AL. TUBING
15.7 FT. EACH SIDE
REFLECTOR

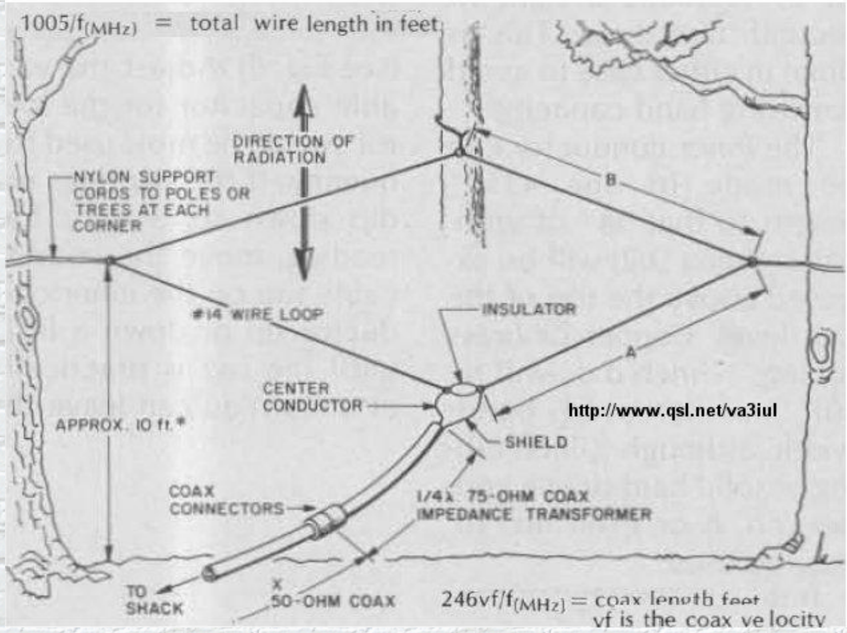
121 - Sterba Curtain Antenna



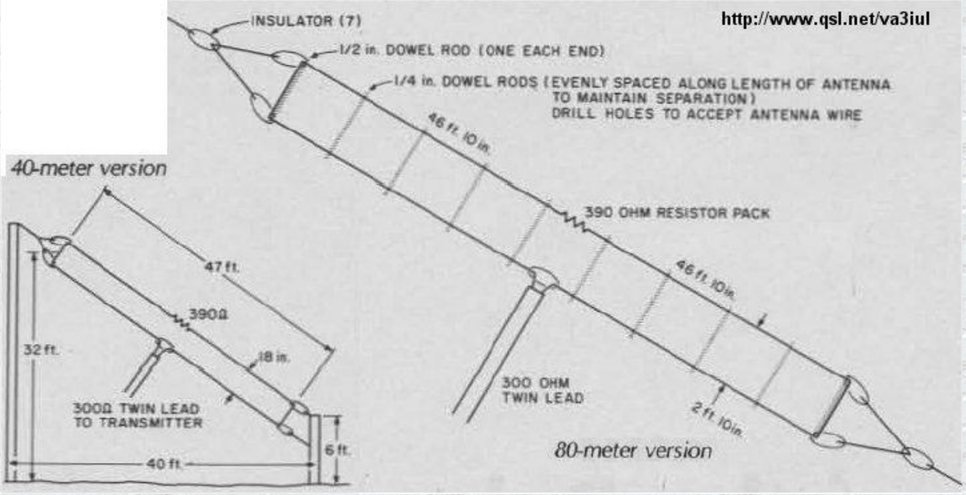
122 - Half-Wave Vertical Zepp Antenna



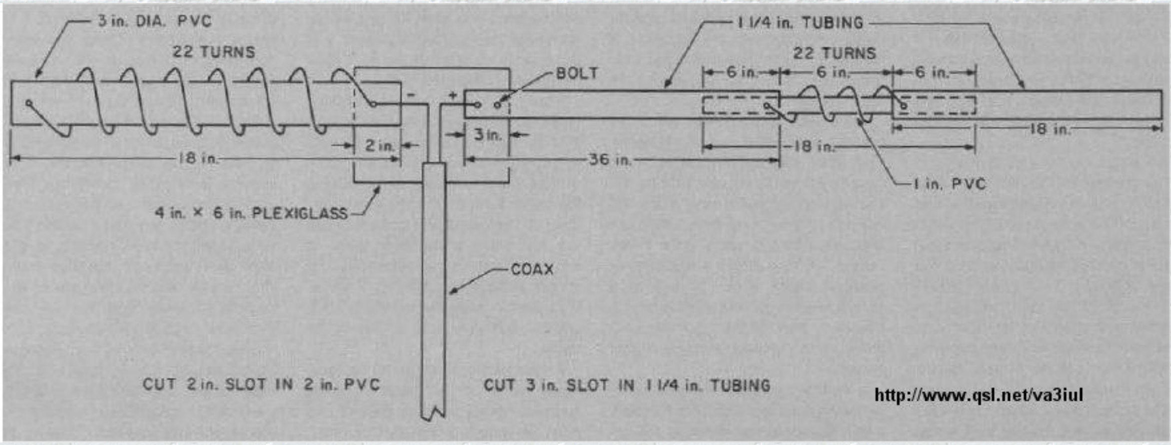
123 - Lazy-Loop Antenna for 40m


1005/f(MHz) = total wire length in feet
DIRECTION OF RADIATION
NYLON SUPPORT CORDS TO POLES OR TREES AT EACH CORNER
B
#14 WIRE LOOP
INSULATOR
A
CENTER CONDUCTOR
http://www.qsl.net/va3iul
APPROX. 10 ft.*
SHIELD
COAX CONNECTORS
1/4λ 75-OHM COAX IMPEDANCE TRANSFORMER
TO SHACK
X
50-OHM COAX
246vf/f(MHz) = coax length feet
vf is the coax velocity

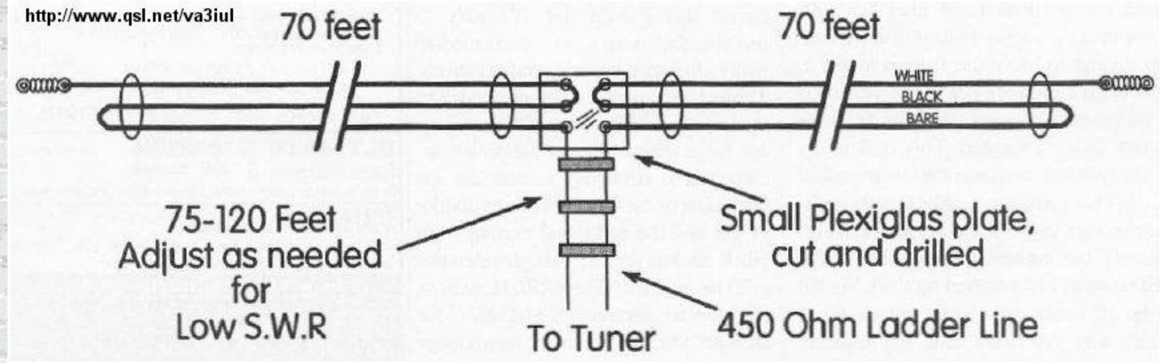
124 - Terminated Folded Dipole for 80m, 40m


INSULATOR (7)
1/2 in. DOWEL ROD (ONE EACH END)
1/4 in. DOWEL RODS (EVENLY SPACED ALONG LENGTH OF ANTENNA TO MAINTAIN SEPARATION) DRILL HOLES TO ACCEPT ANTENNA WIRE
http://www.qsl.net/va3iul
46 ft. 10 in.
390 OHM RESISTOR PACK
46 ft. 10 in.
300 OHM TWIN LEAD
2 ft. 10 in.
80-meter version
40-meter version
47 ft.
390Ω
32 ft.
18 in.
300Ω TWIN LEAD TO TRANSMITTER
6 ft.
40 ft.

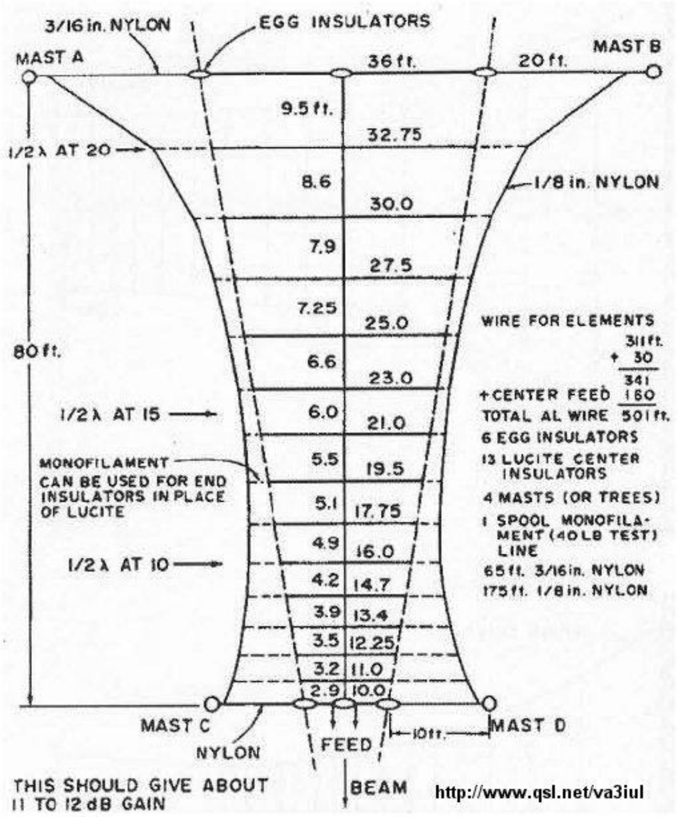
125 - Short-Fat Antenna for 15m



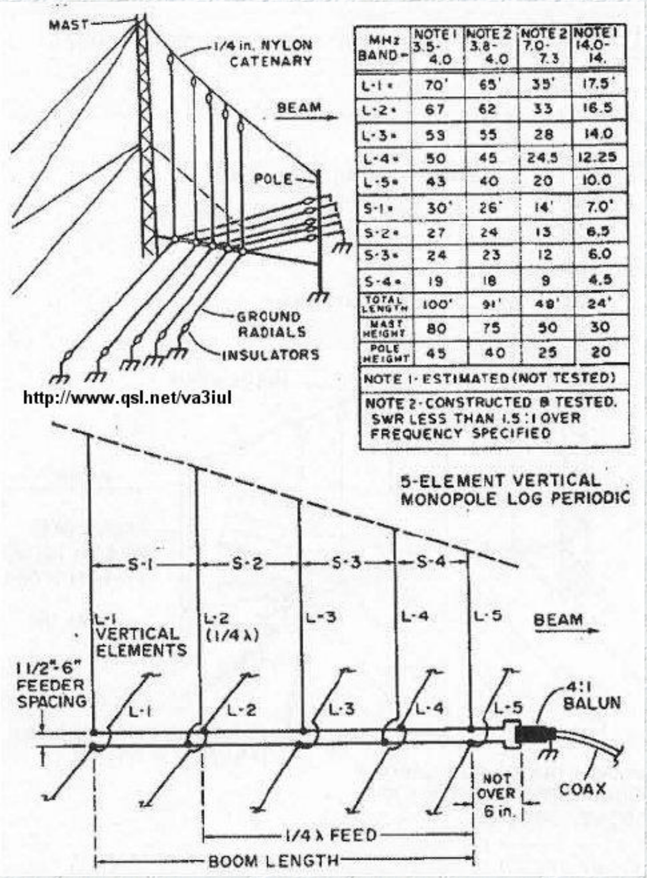
126 - Cobra Antenna for 80m



127 - Log-Periodic Wire Antenna for 20m, 15m, 10m



128 - 5-Element Log-Periodic Vertical Antenna for 80m, 40m, 20m



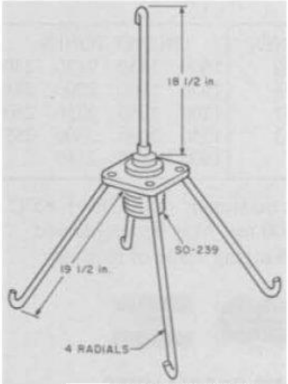
MHz BAND-	NOTE 1 3.5-4.0	NOTE 2 3.8-4.0	NOTE 2 7.0-7.3	NOTE 1 14.0-14.
L-1 =	70'	65'	35'	17.5'
L-2 =	67	62	33	16.5
L-3 =	53	55	28	14.0
L-4 =	50	45	24.5	12.25
L-5 =	43	40	20	10.0
S-1 =	30'	26'	14'	7.0'
S-2 =	27	24	13	6.5
S-3 =	24	23	12	6.0
S-4 =	19	18	9	4.5
TOTAL LENGTH	100'	91'	48'	24'
MAST HEIGHT	80	75	50	30
POLE HEIGHT	45	40	25	20

NOTE 1 - ESTIMATED (NOT TESTED)

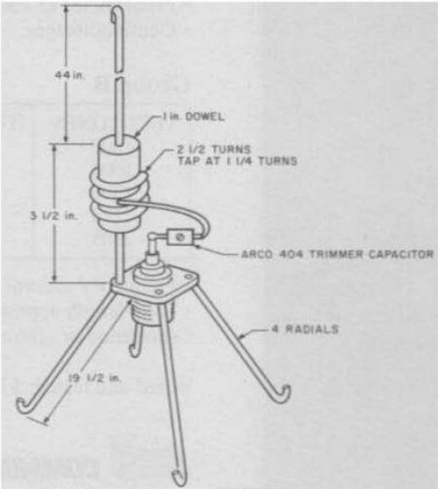
NOTE 2 - CONSTRUCTED & TESTED. SWR LESS THAN 1.5:1 OVER FREQUENCY SPECIFIED

http://www.qsl.net/va3iul

129 - 2m Vertical Wire Antennas



Simple 1/4λ 2-meter ground-plane antenna.



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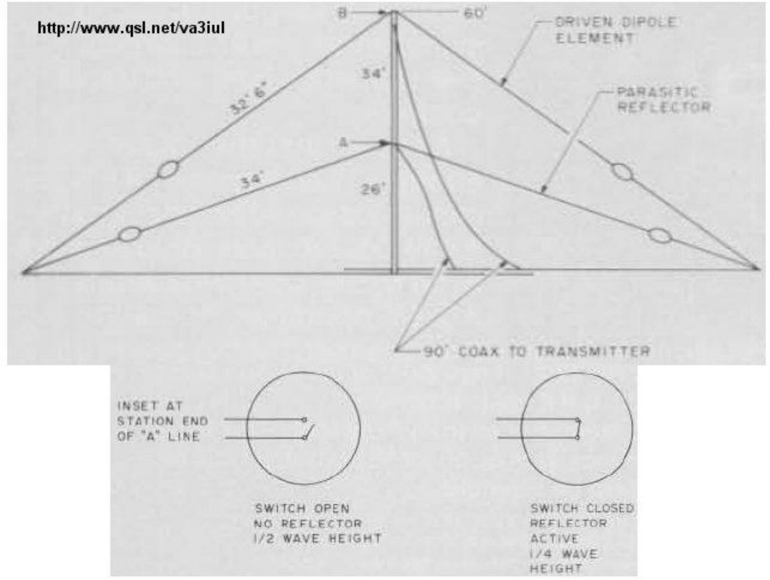
Experimental 5/8λ vertical with 1/4λ ground plane.

130 - Earth-Mover Inverted-V Antenna for 40m



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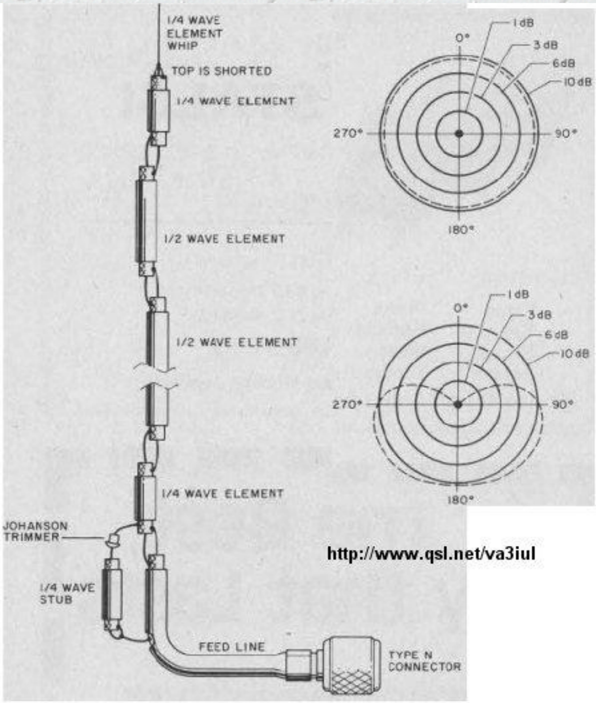
131 - Coax-Cable Collinear Antennas



8 elements = 6 dB. 16 elements = 9 dB

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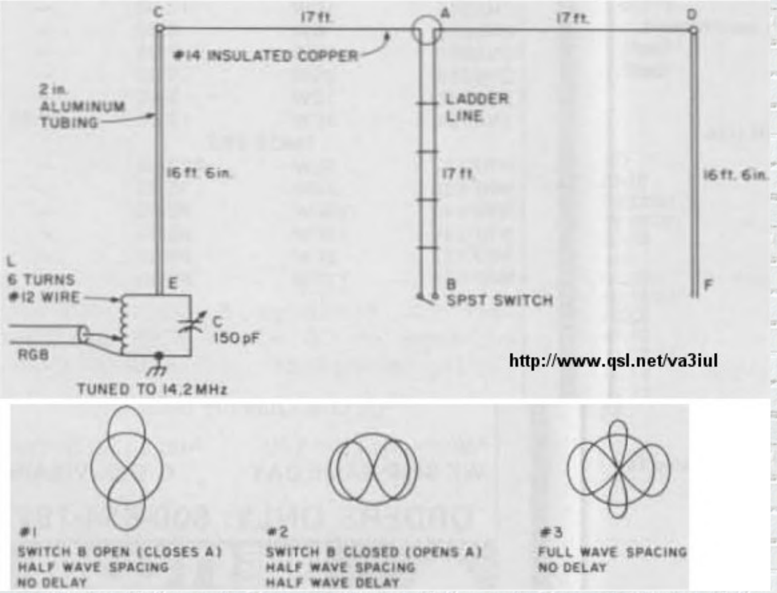
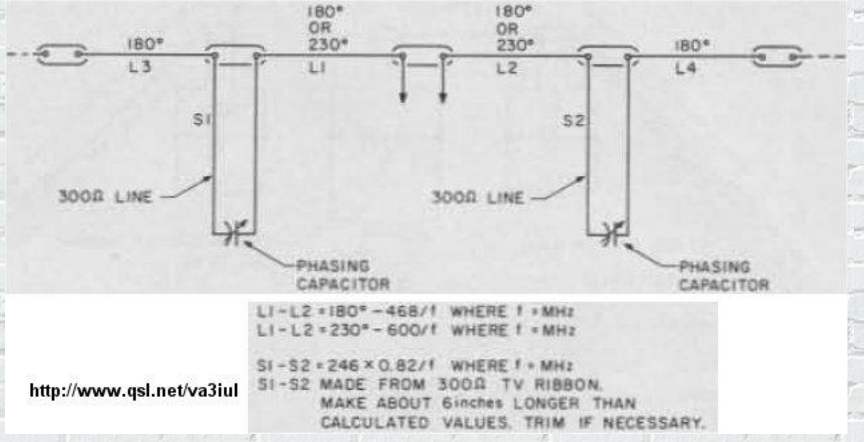
132 - Double Bobtail Antenna for 20m



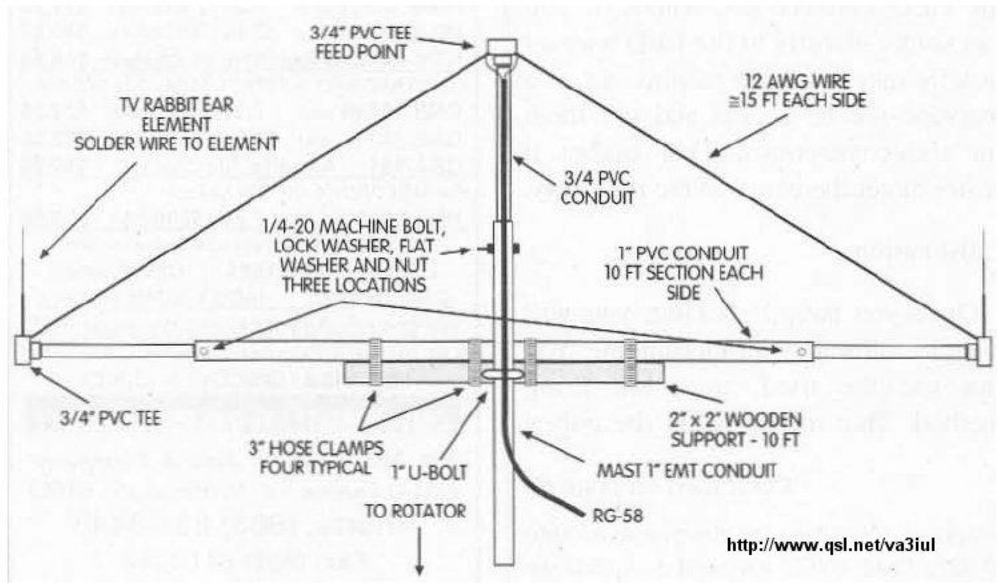
133 - Collinear Zepp Antenna



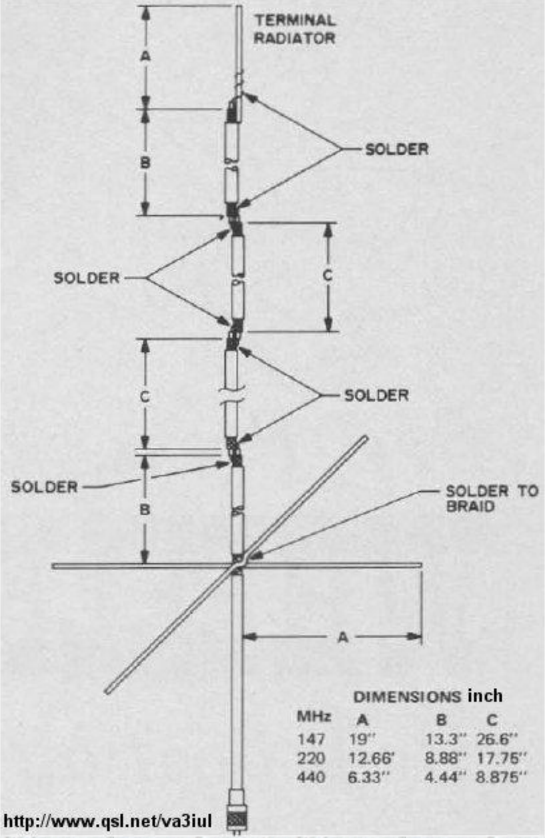
L1-L2 = 180° - 468/f WHERE f = MHz
L1-L2 = 230° - 600/f WHERE f = MHz

S1-S2 = 246 × 0.82/f WHERE f = MHz
S1-S2 MADE FROM 300Ω TV RIBBON.
MAKE ABOUT 6inches LONGER THAN
CALCULATED VALUES. TRIM IF NECESSARY.

134 - Taylor Vee Antenna for 20m



135 - Collinear Vertical Antenna 6dB-Gain for 2m, 1.3m, 73cm



MHz	A	B	C
147	19''	13.3''	26.6''
220	12.66'	8.88''	17.75''
440	6.33''	4.44''	8.875''

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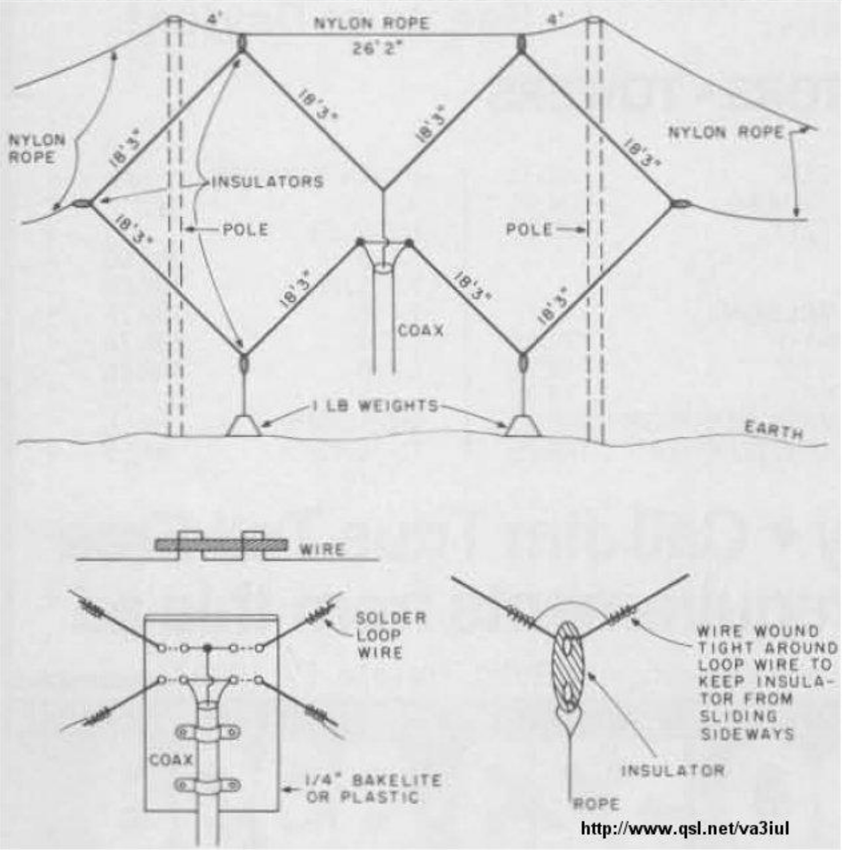
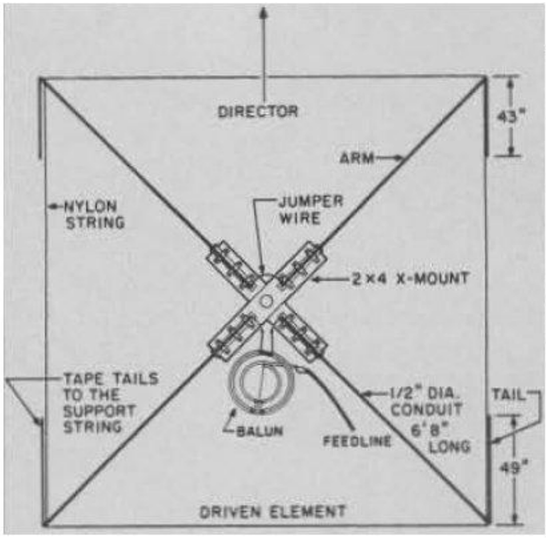
136 - Bi-Loop Antenna for 20m

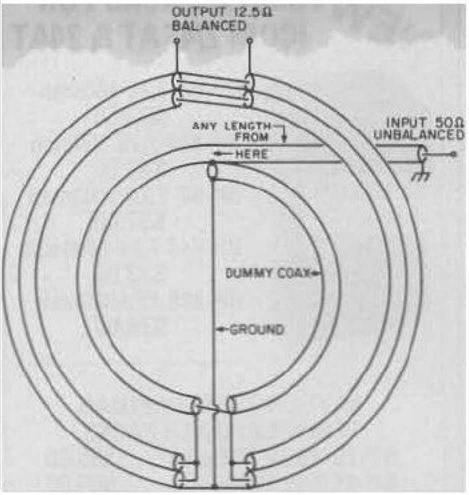


http://www.qsl.net/va3iul

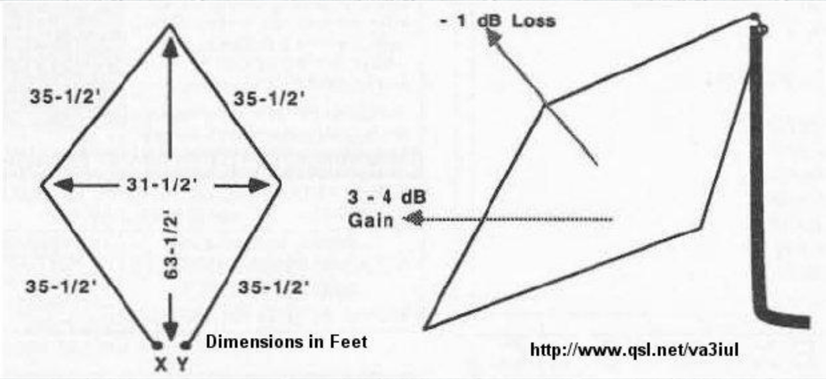
137 - Wire Beam 6dBd-Gain for 10m



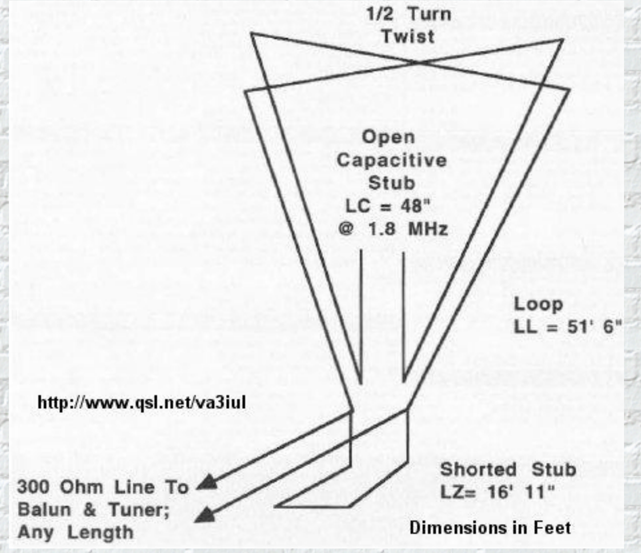
http://www.qsl.net/va3iul



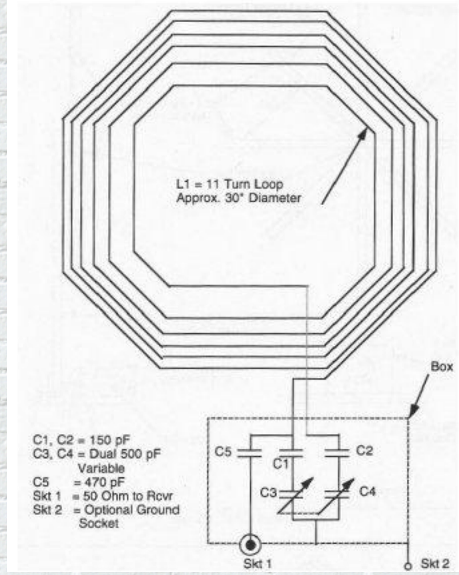
138 - Sloping Diamond Antenna 4dB-Gain for 40m

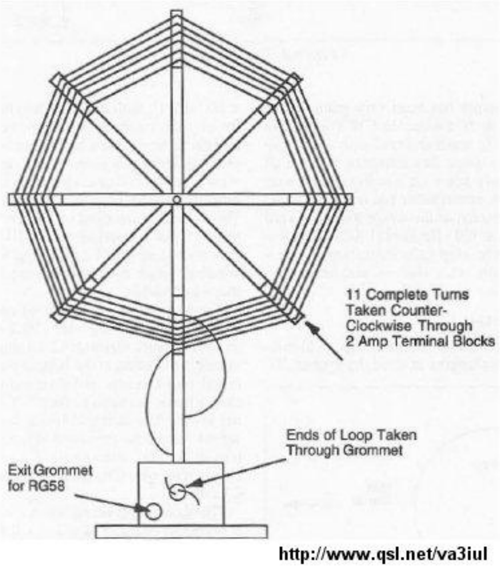


139 - Twisted Loop Antenna for 160m

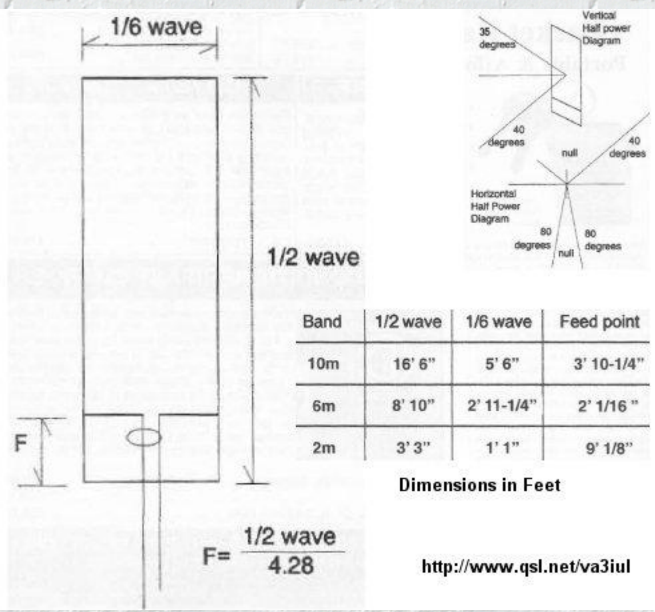

1/2 Turn Twist
Open Capacitive Stub LC = 48" @ 1.8 MHz
Loop LL = 51' 6"
http://www.qsl.net/va3iul
300 Ohm Line To Balun & Tuner; Any Length
Shorted Stub LZ= 16' 11"
Dimensions in Feet

140 - DX RX Loop Antenna for 160m




11 Complete Turns Taken Counter-Clockwise Through 2 Amp Terminal Blocks
Ends of Loop Taken Through Grommet
Exit Grommet for RG58
http://www.qsl.net/va3iul

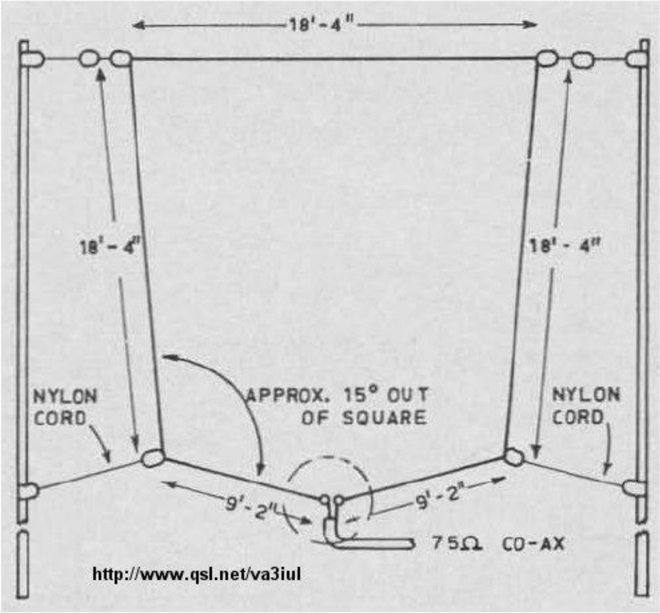
141 - Hentenna 3dB-Gain for 10m, 6m, 2m



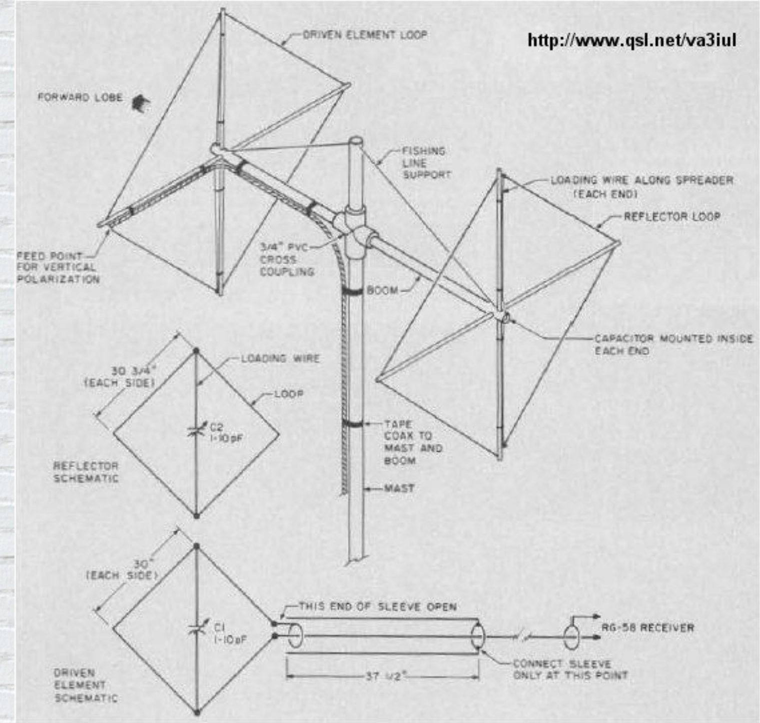
Band	1/2 wave	1/6 wave	Feed point
10m	16' 6"	5' 6"	3' 10-1/4"
6m	8' 10"	2' 11-1/4"	2' 1/16 "
2m	3' 3"	1' 1"	9' 1/8"

Dimensions in Feet

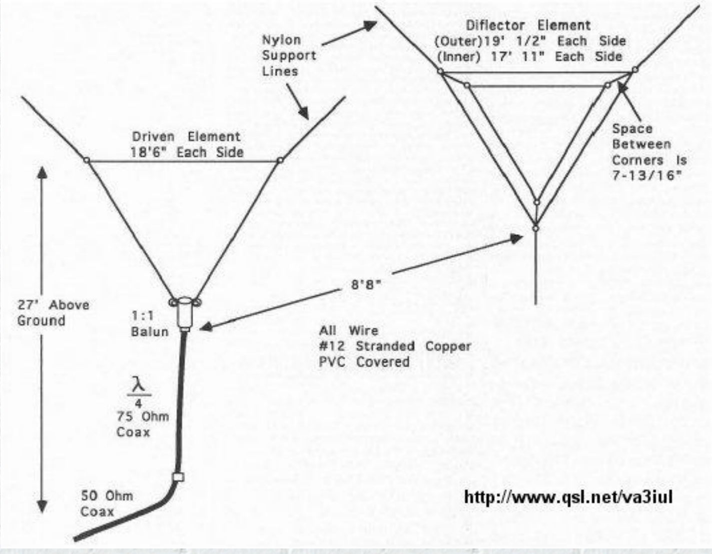
142 - VK2AAR Wire Antenna for 20m



143 - 2-Elements Quad Antenna for 6m

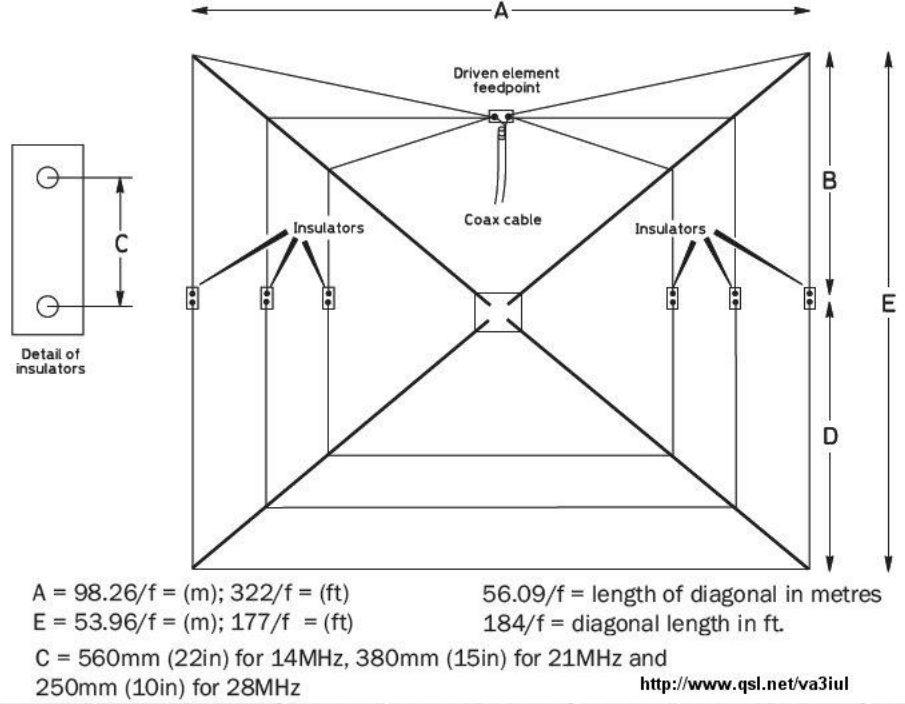


144 - Hula-Loop Bidirectional 6dB-Gain Antenna for 17m



http://www.qsl.net/va3iul

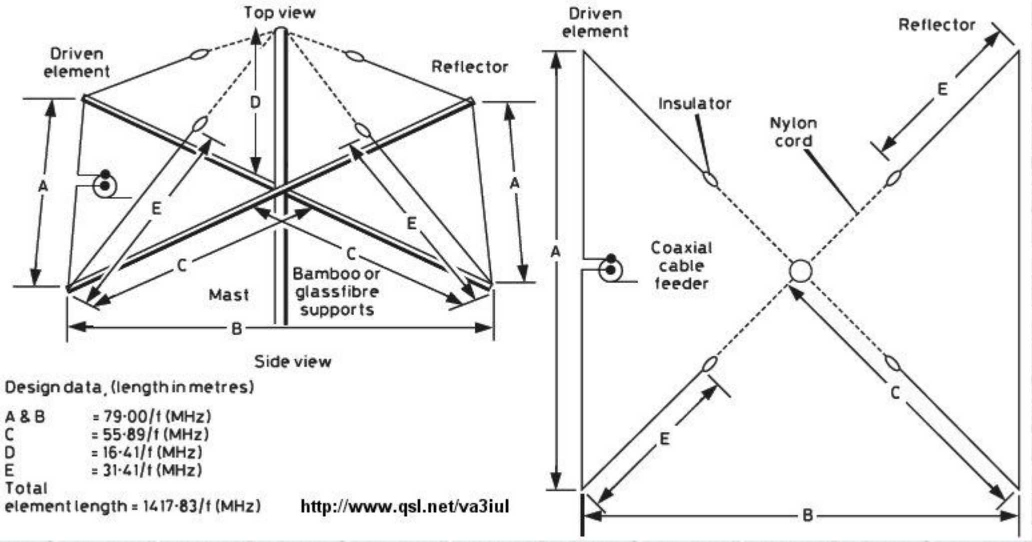
145 - Moxon Rectangle Beam for 15m-10m



A = 98.26/f = (m); 322/f = (ft)
E = 53.96/f = (m); 177/f = (ft)
56.09/f = length of diagonal in metres
184/f = diagonal length in ft.
C = 560mm (22in) for 14MHz, 380mm (15in) for 21MHz and
250mm (10in) for 28MHz

http://www.qsl.net/va3iul

146 - Double-D Beam 4dB-Gain



Design data, (length in metres)

A & B = 79·00/f (MHz)
C = 55·89/f (MHz)
D = 16·41/f (MHz)
E = 31·41/f (MHz)
Total element length = 1417·83/f (MHz)

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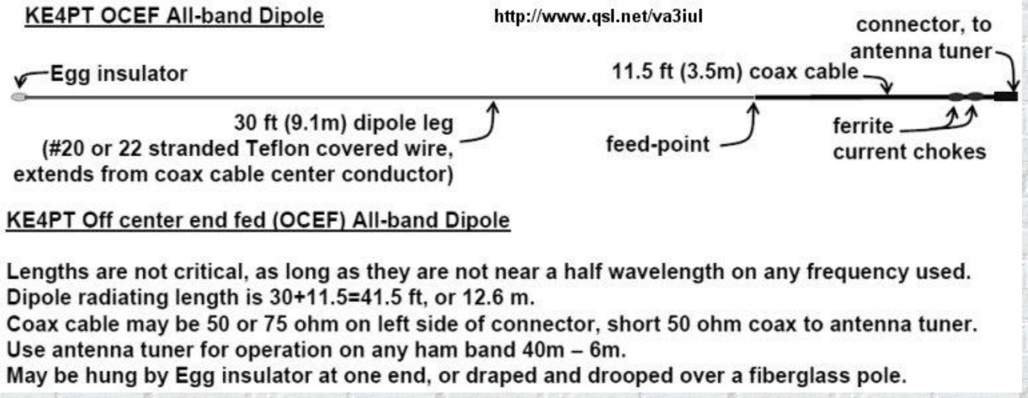
147 - KE4PT OCEF All-Band Dipole


KE4PT OCEF All-band Dipole
http://www.qsl.net/va3iul
connector, to antenna tuner
Egg insulator
11.5 ft (3.5m) coax cable
30 ft (9.1m) dipole leg (#20 or 22 stranded Teflon covered wire, extends from coax cable center conductor)
feed-point
ferrite current chokes

KE4PT Off center end fed (OCEF) All-band Dipole

Lengths are not critical, as long as they are not near a half wavelength on any frequency used.
Dipole radiating length is 30+11.5=41.5 ft, or 12.6 m.
Coax cable may be 50 or 75 ohm on left side of connector, short 50 ohm coax to antenna tuner.
Use antenna tuner for operation on any ham band 40m – 6m.
May be hung by Egg insulator at one end, or draped and drooped over a fiberglass pole.

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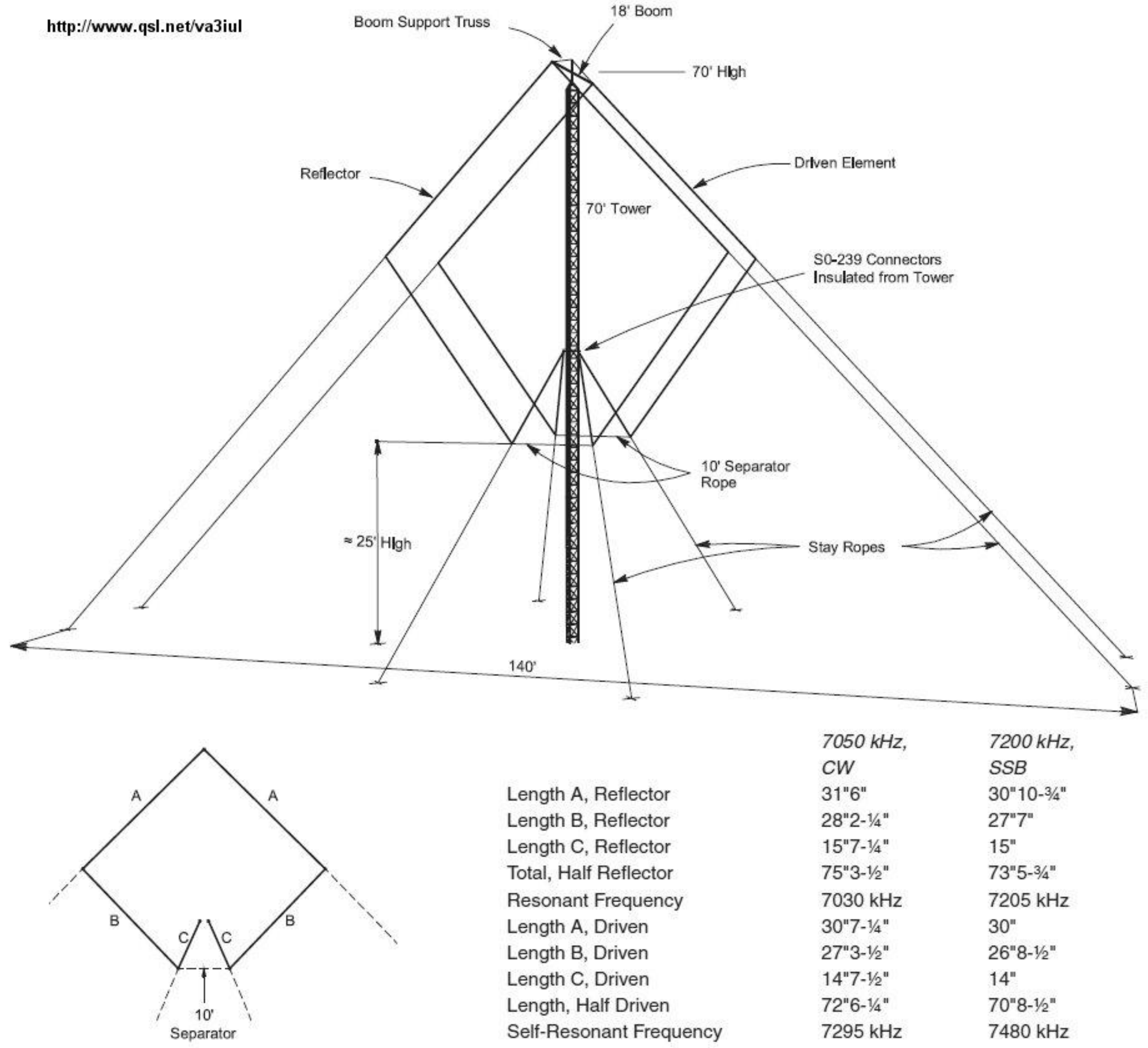
148 - Wire Quad Antenna for 40m



	7050 kHz, CW	7200 kHz, SSB
Length A, Reflector	31"6"	30"10-¾"
Length B, Reflector	28"2-¼"	27"7"
Length C, Reflector	15"7-¼"	15"
Total, Half Reflector	75"3-½"	73"5-¾"
Resonant Frequency	7030 kHz	7205 kHz
Length A, Driven	30"7-¼"	30"
Length B, Driven	27"3-½"	26"8-½"
Length C, Driven	14"7-½"	14"
Length, Half Driven	72"6-¼"	70"8-½"
Self-Resonant Frequency	7295 kHz	7480 kHz

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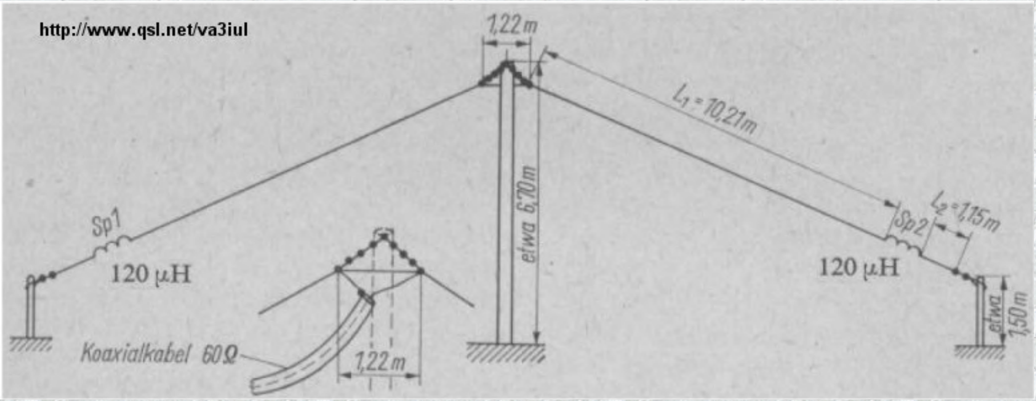
149 - Inclined Dipole Antenna for 80m, 40m



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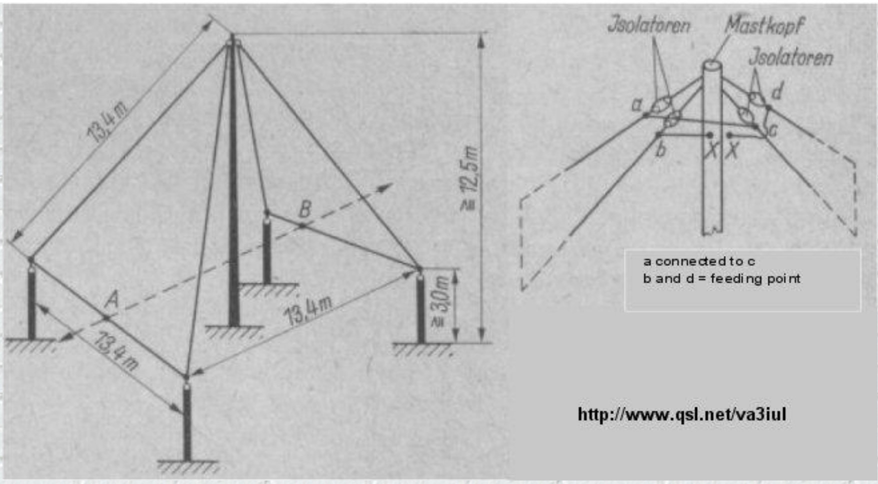
150 - Pyramidal Wire Antenna for 80m



a connected to c
b and d = feeding point

http://www.qsl.net/va3iul

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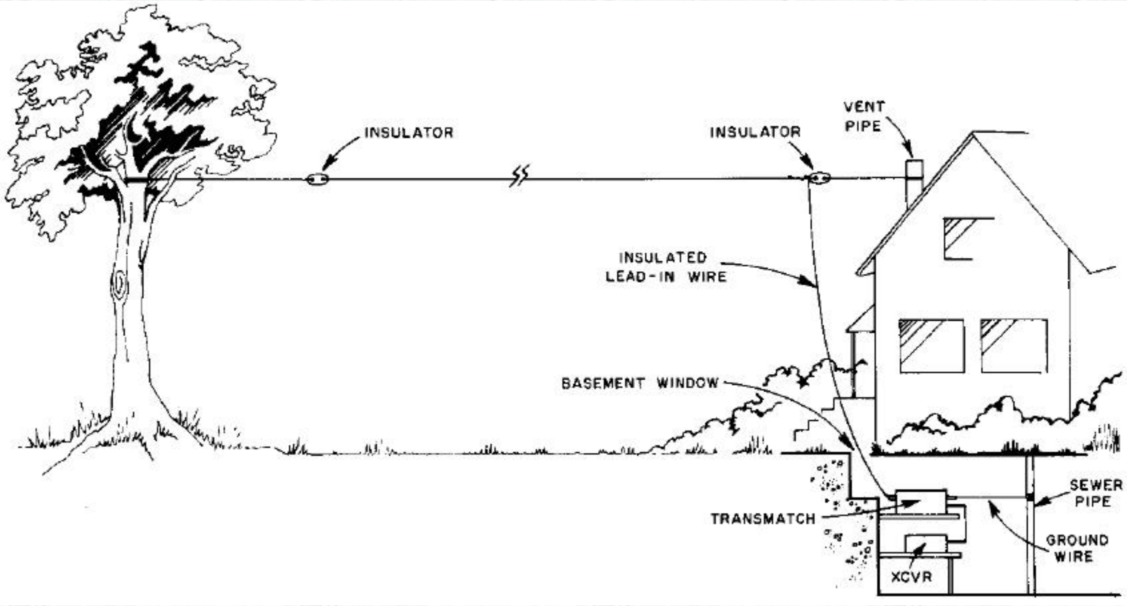
151 - Random Wire Antenna All Bands



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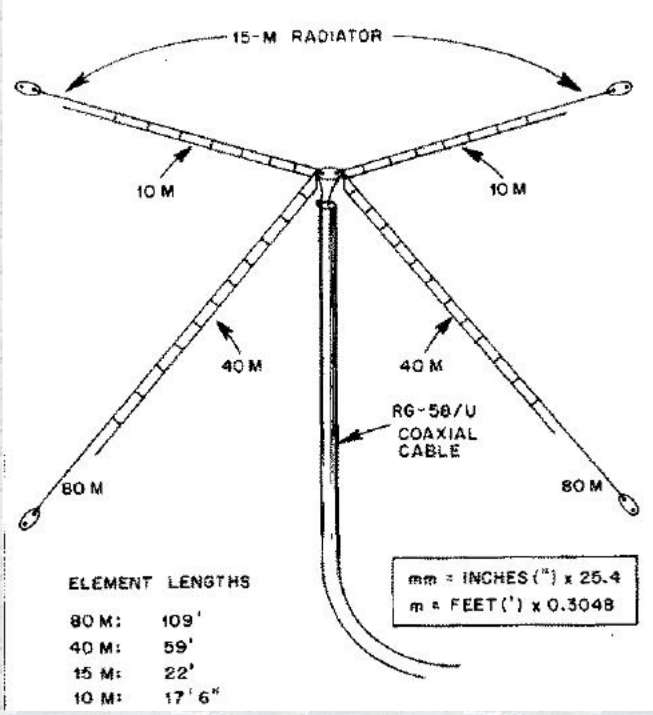
152 - Multiband Dipole Antenna for 80m, 40m,15m, 10m



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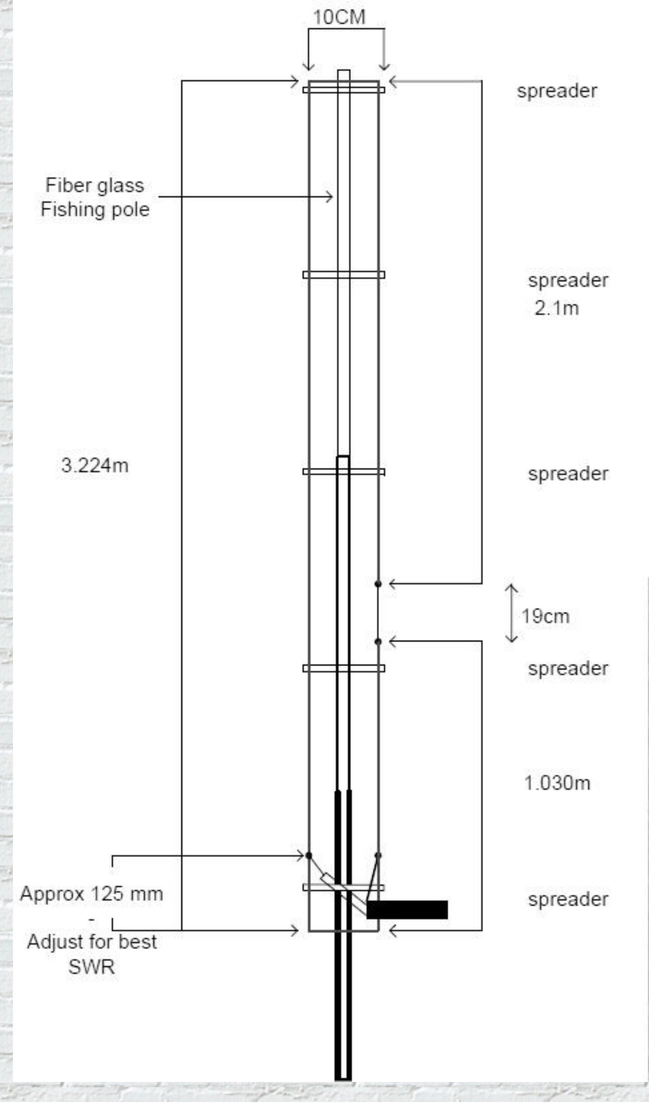
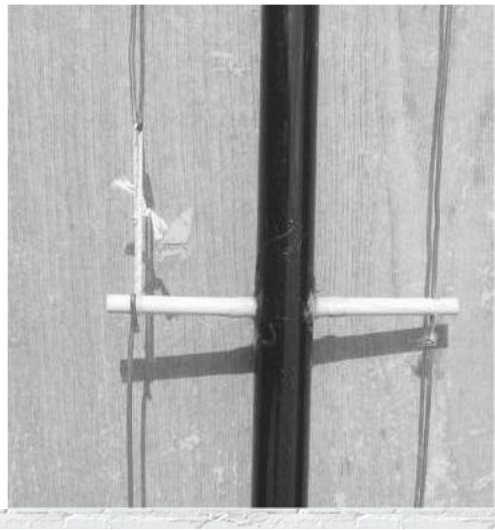
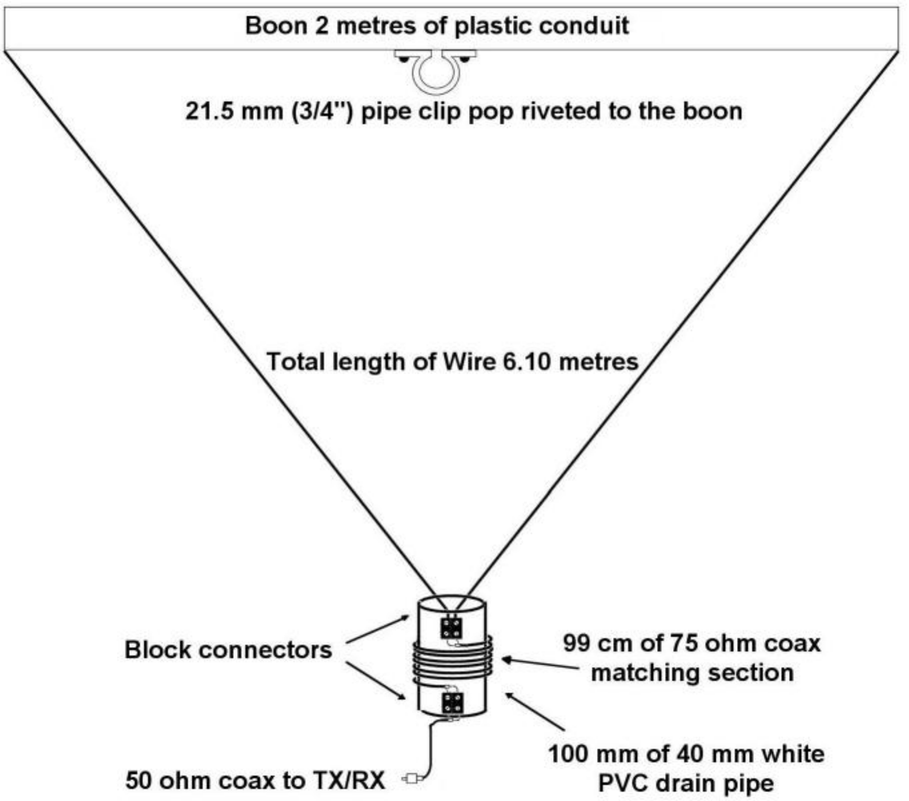
153 - Slim Jim Wire Antenna for 4m

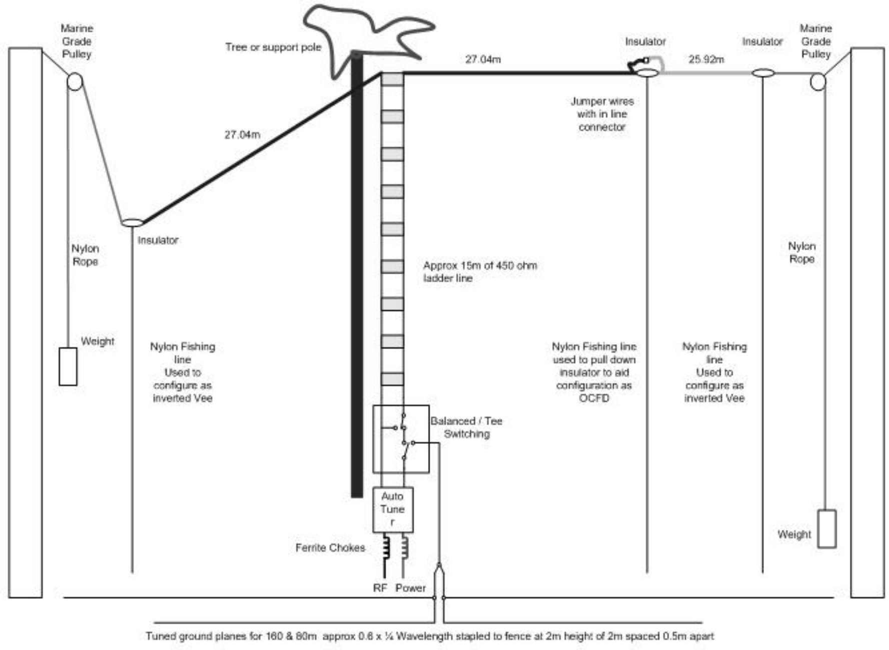




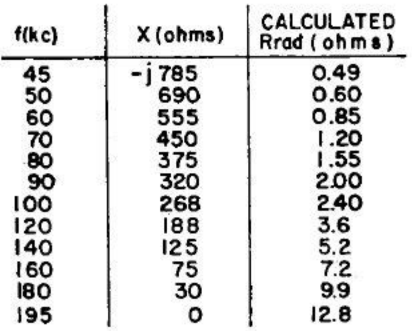
154 - Delta Loop for 6m


Boon 2 metres of plastic conduit
21.5 mm (3/4") pipe clip pop riveted to the boon
Total length of Wire 6.10 metres
Block connectors
99 cm of 75 ohm coax matching section
50 ohm coax to TX/RX
100 mm of 40 mm white PVC drain pipe

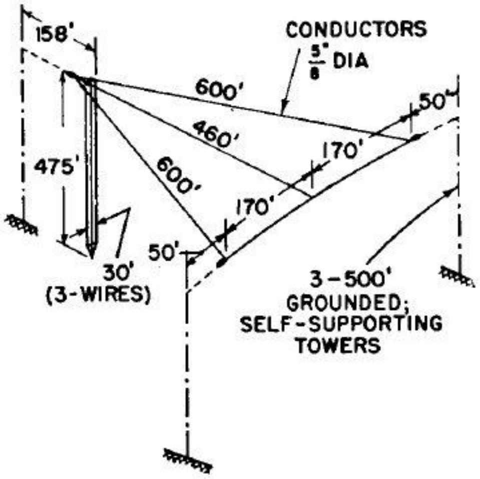
155 - Re-Configurable Antenna for 160m and 80m


Marine Grade Pulley
Tree or support pole
27.04m
Insulator
25.92m
Insulator
Marine Grade Pulley
Jumper wires with in line connector
27.04m
Insulator
Nylon Rope
Approx 15m of 450 ohm ladder line
Nylon Rope
Weight
Nylon Fishing line Used to configure as inverted Vee
Nylon Fishing line used to pull down insulator to aid configuration as OCFD
Nylon Fishing line Used to configure as inverted Vee
Balanced / Tee Switching
Auto Tuner
Ferrite Chokes
Weight
RF
Power
Tuned ground planes for 160 & 80m approx 0.8 x ¼ Wavelength stapled to fence at 2m height of 2m spaced 0.5m apart

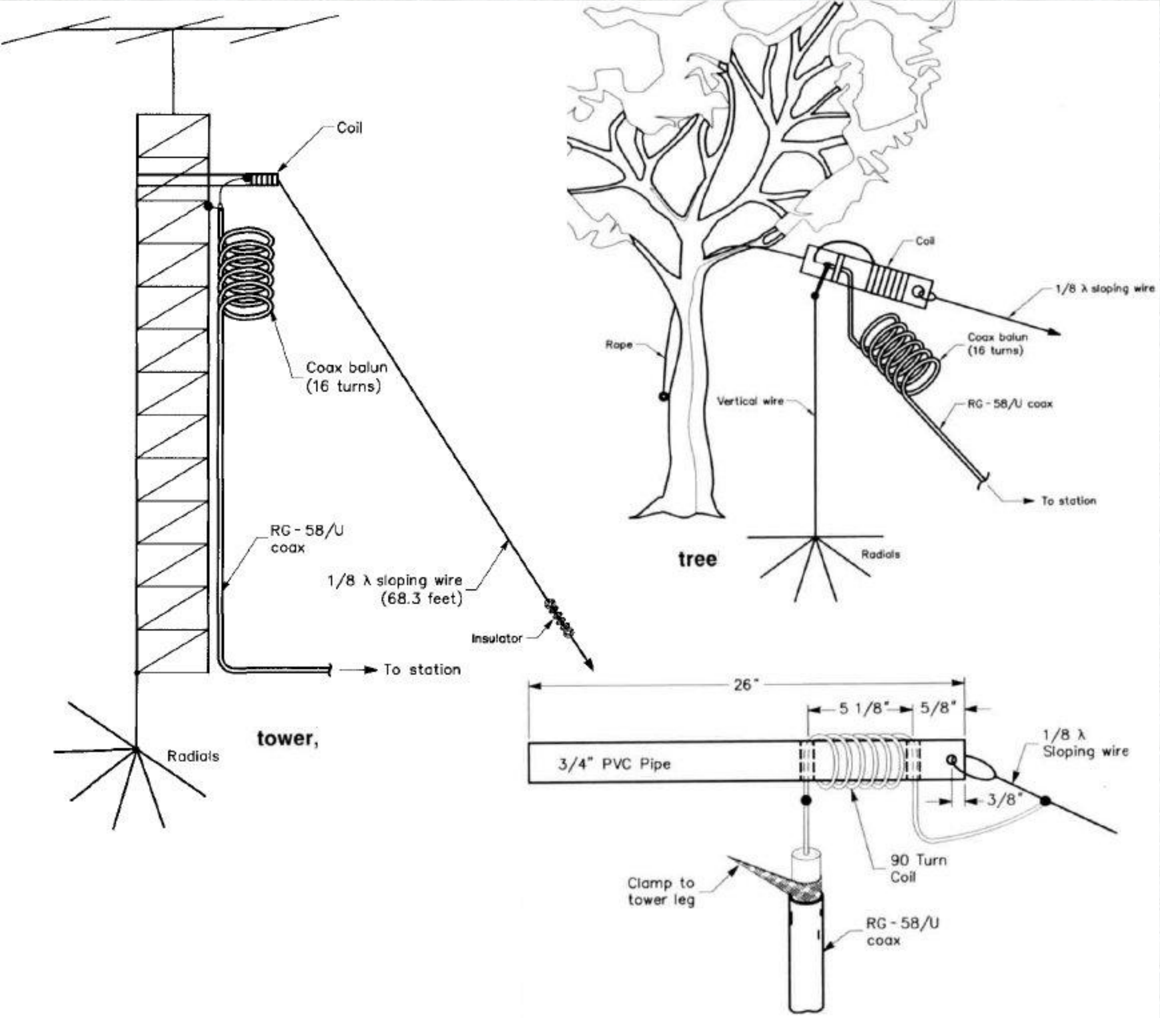
156 - Very Low Frequency Inverted-L Antenna



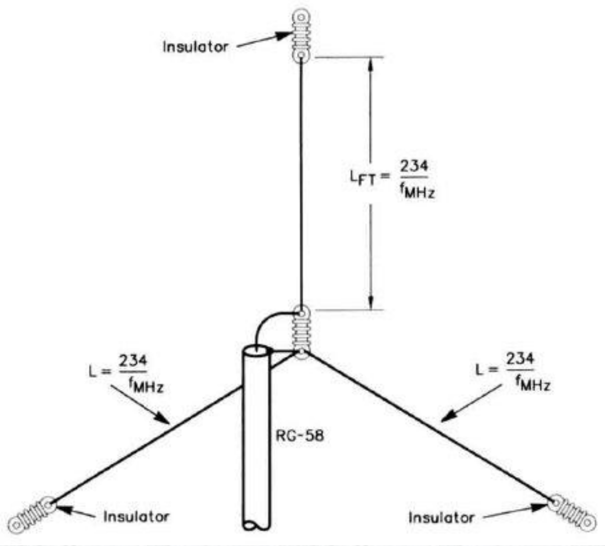
f(kc)	X (ohms)	CALCULATED Rrad (ohms)
45	-j 785	0.49
50	690	0.60
60	555	0.85
70	450	1.20
80	375	1.55
90	320	2.00
100	268	2.40
120	188	3.6
140	125	5.2
160	75	7.2
180	30	9.9
195	0	12.8



157 - Reduced Size Half Sloper Antenna for 160m

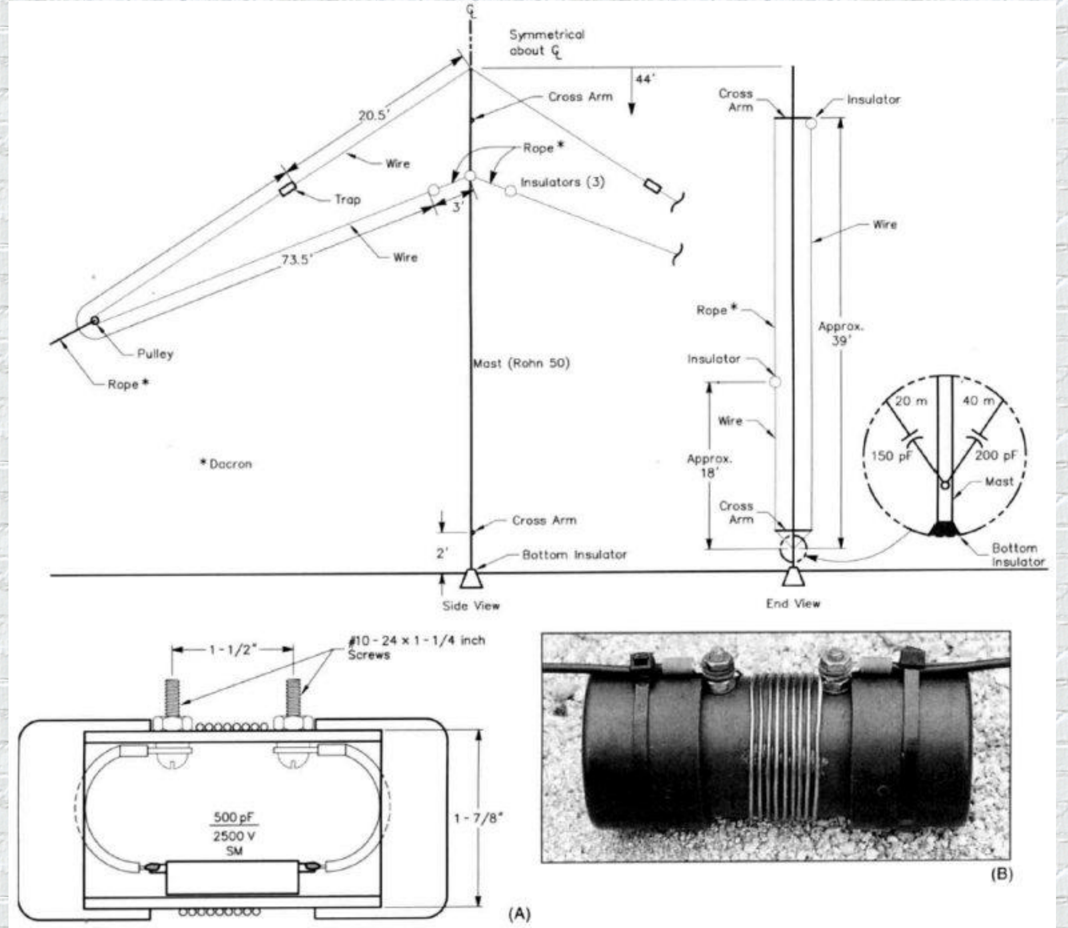


158 - Tree-Mounted HF Antenna

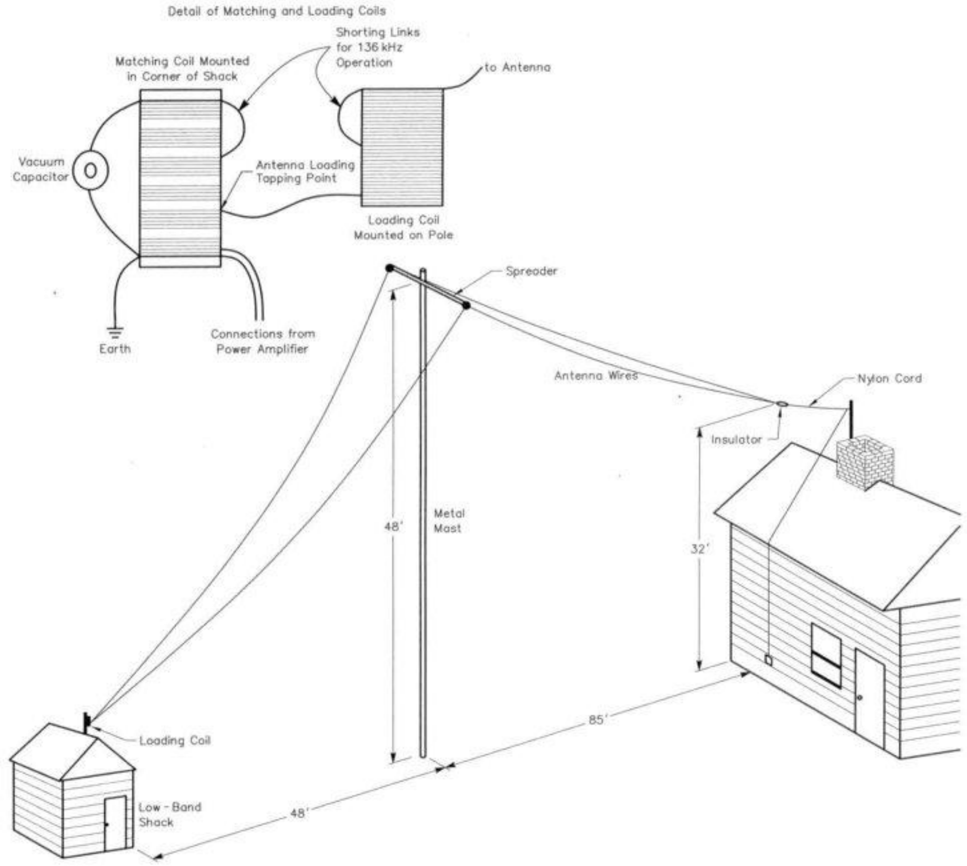


Insulator
$L_{FT} = \frac{234}{f_{MHz}}$
$L = \frac{234}{f_{MHz}}$
$L = \frac{234}{f_{MHz}}$
RG-58
Insulator
Insulator

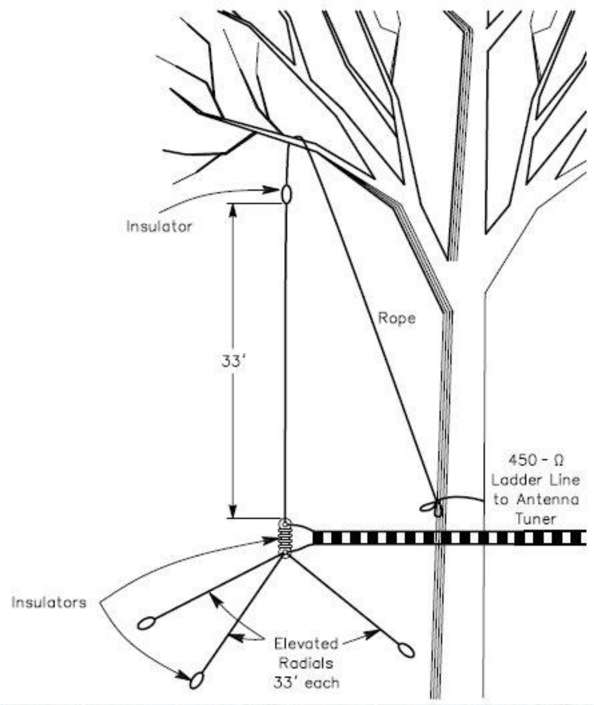
159 - Multiband Vertical Antenna for 80m, 40m, 20m



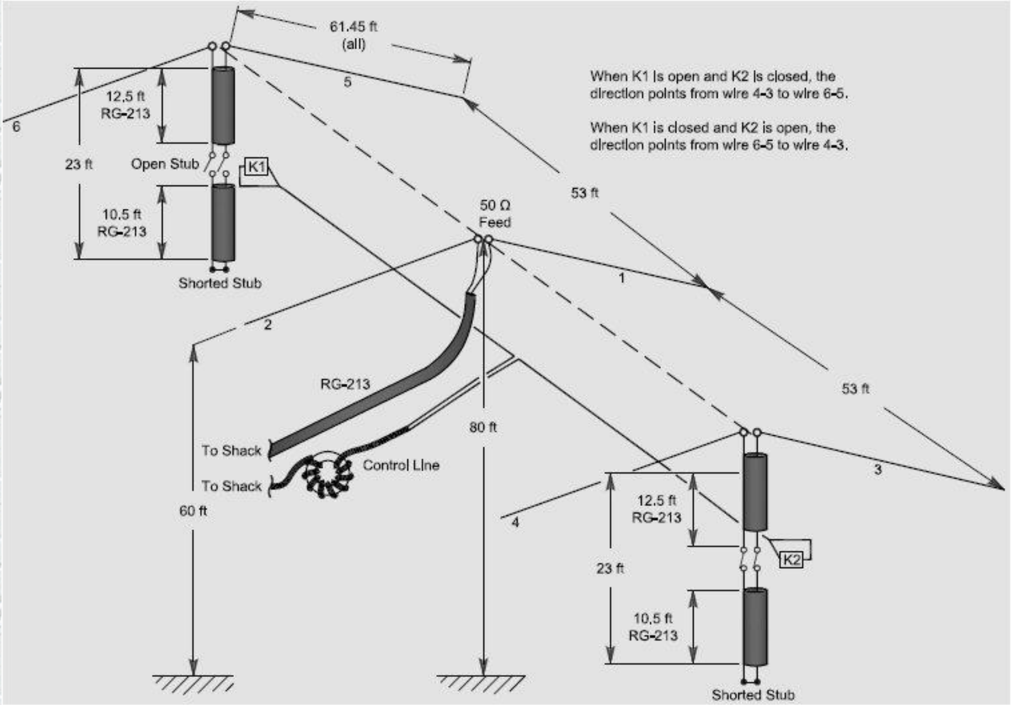
160 - Marconi Antenna for 136 kHz


Detail of Matching and Loading Coils
Shorting Links for 136 kHz Operation
Matching Coil Mounted in Corner of Shack
to Antenna
Vacuum Capacitor
Antenna Loading Tapping Point
Loading Coil Mounted on Pole
Spreader
Earth
Connections from Power Amplifier
Antenna Wires
Nylon Cord
Insulator
48'
Metal Mast
32'
Loading Coil
85'
Low - Band Shack
48'

161 - Simple Killer Antenna for 40m


Insulator
Rope
33'
450 - Ω Ladder Line to Antenna Tuner
Insulators
Elevated Radials 33' each

162 - Stub-Directed V Antenna for 80m

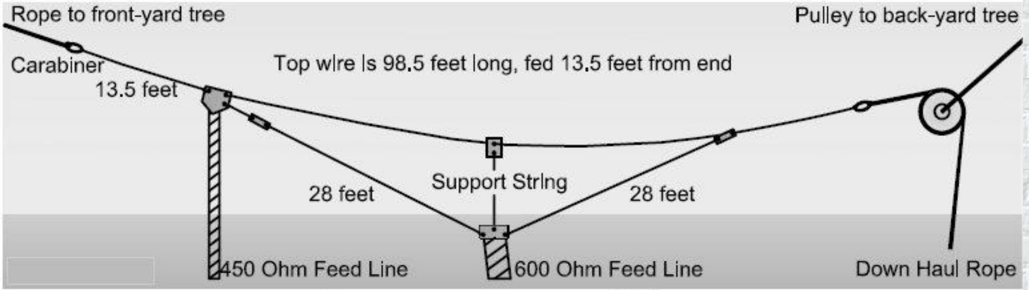


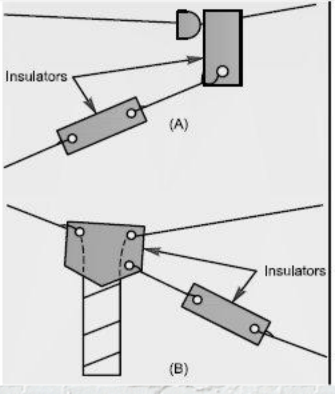
When K1 is open and K2 is closed, the direction points from wire 4-3 to wire 6-5.

When K1 is closed and K2 is open, the direction points from wire 6-5 to wire 4-3.

---

163 - KT0NY Over-and-Under DX Antenna for 20m





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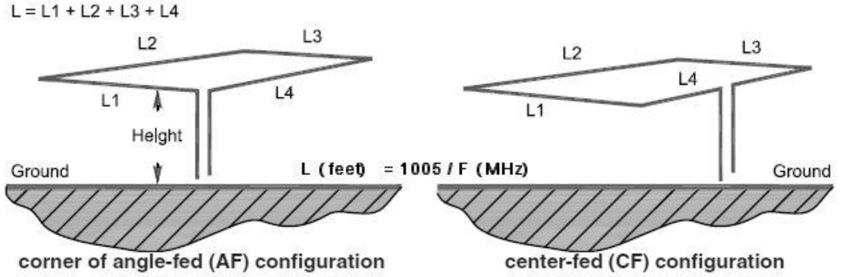
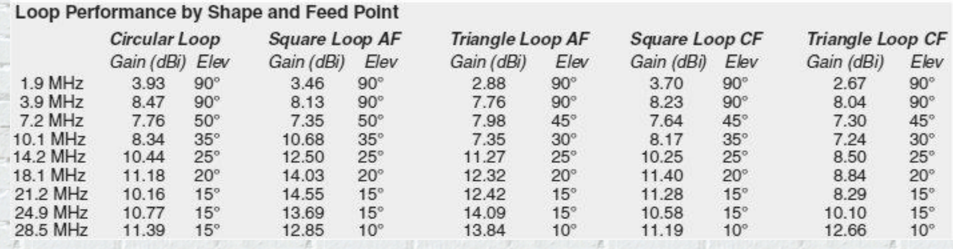
164 - Horizontal Loop Antennas


L = L1 + L2 + L3 + L4
L2
L3
L1
L4
Height
Ground
L (feet) = 1005 / F (MHz)
L2
L3
L4
L1
Ground
corner of angle-fed (AF) configuration
center-fed (CF) configuration

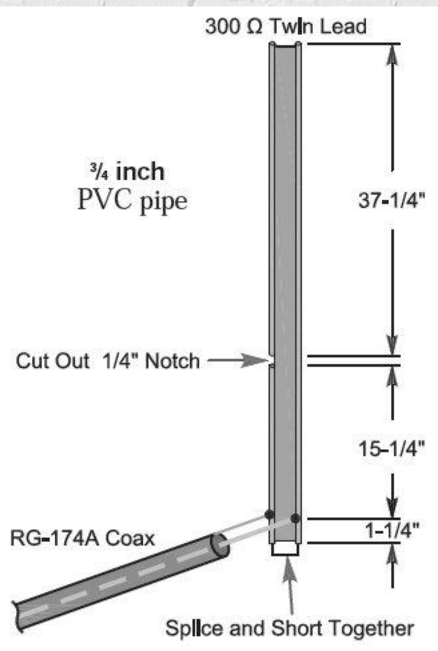


Loop Performance by Shape and Feed Point

	Circular Loop		*Square Loop AF*		*Triangle Loop AF*		*Square Loop CF*		*Triangle Loop CF*	
	Gain (dBi)	*Elev*	*Gain (dBi)*	*Elev*	*Gain (dBi)*	*Elev*	*Gain (dBi)*	*Elev*	*Gain (dBi)*	*Elev*
1.9 MHz	3.93	90°	3.46	90°	2.88	90°	3.70	90°	2.67	90°
3.9 MHz	8.47	90°	8.13	90°	7.76	90°	8.23	90°	8.04	90°
7.2 MHz	7.76	50°	7.35	50°	7.98	45°	7.64	45°	7.30	45°
10.1 MHz	8.34	35°	10.68	35°	7.35	30°	8.17	35°	7.24	30°
14.2 MHz	10.44	25°	12.50	25°	11.27	25°	10.25	25°	8.50	25°
18.1 MHz	11.18	20°	14.03	20°	12.32	20°	11.40	20°	8.84	20°
21.2 MHz	10.16	15°	14.55	15°	12.42	15°	11.28	15°	8.29	15°
24.9 MHz	10.77	15°	13.69	15°	14.09	15°	10.58	15°	10.10	15°
28.5 MHz	11.39	15°	12.85	10°	13.84	10°	11.19	10°	12.66	10°

---

165 - Ribbon J-Pole for 2m



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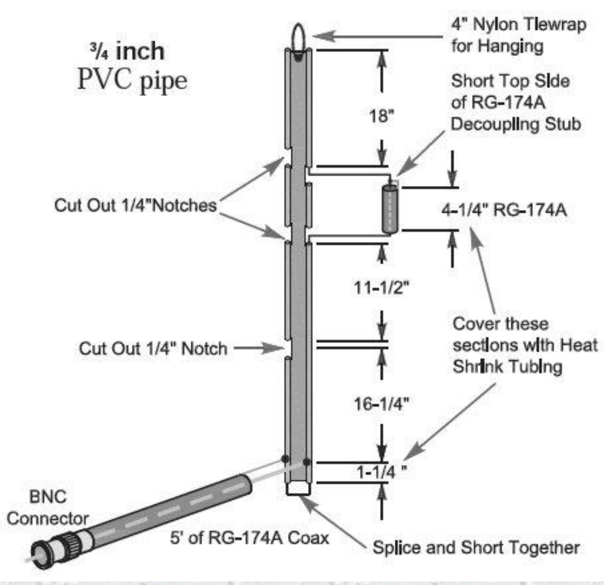
166 - Dual Band Ribbon J-Pole for 2m, 70cm


¾ inch
PVC pipe
4" Nylon Tiewrap for Hanging
Short Top Side of RG-174A Decoupling Stub
18"
Cut Out 1/4"Notches
4-1/4" RG-174A
11-1/2"
Cover these sections with Heat Shrink Tubing
Cut Out 1/4" Notch
16-1/4"
1-1/4 "
BNC Connector
5' of RG-174A Coax
Splice and Short Together

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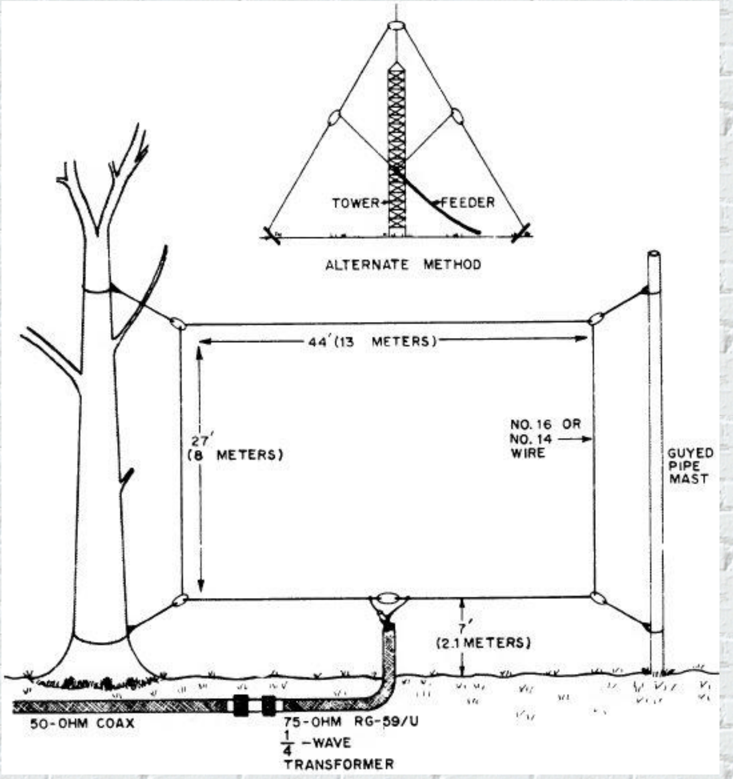
167 - Square Vertical Loop Antenna for 40m



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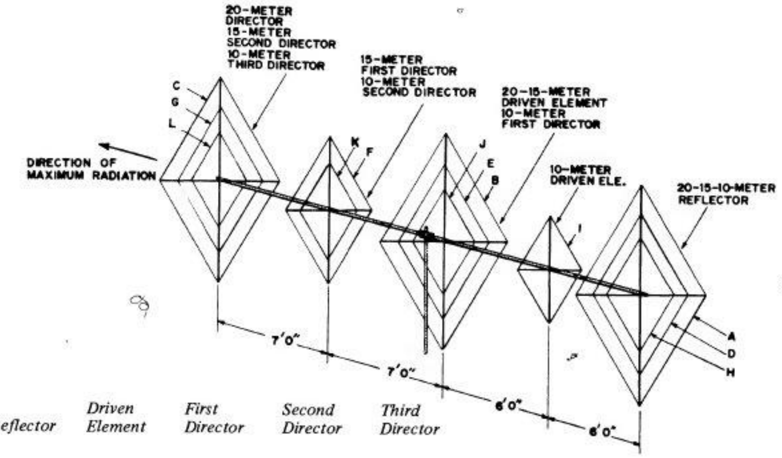
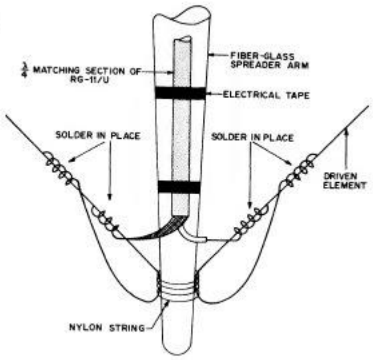
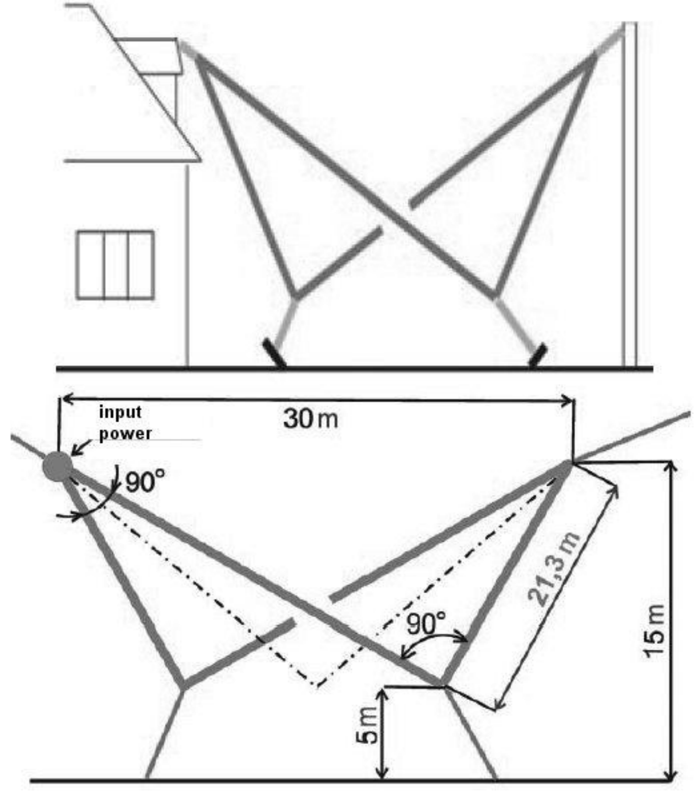
168 - Tri-Band Quad Antenna for 20m, 15m, 10m



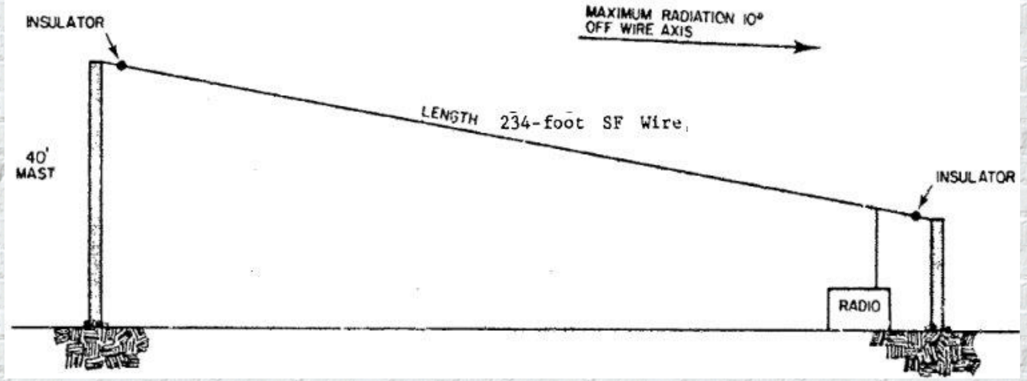


Band	*Reflector*	*Driven Element*	*First Director*	*Second Director*	*Third Director*
20 Meters	(A) 72′ 8″	(B) 71′ 3″	(C) 69′ 6″	—	—
15 Meters	(D) 48′ 6½″	(E) 47′ 7½″	(F) 46′ 5″	(G) 46′ 5″	—
10 Meters	(H) 36′ 2½″	(I) 35′ 6″	(J) 34′ 7″	(K) 34′ 7″	(L) 34′ 7″

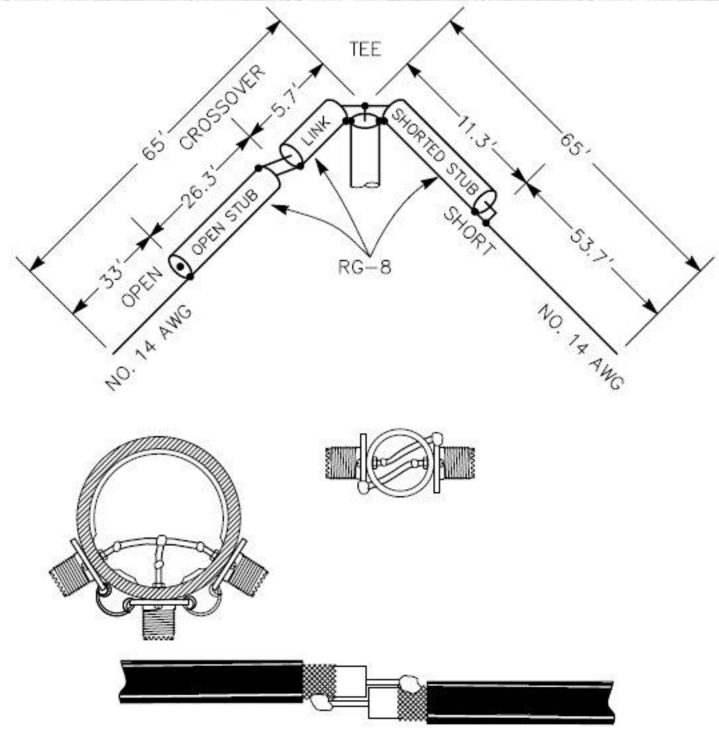
169 - 3D Quad Antenna for 80m, 40m, 20m, 15m, 10m



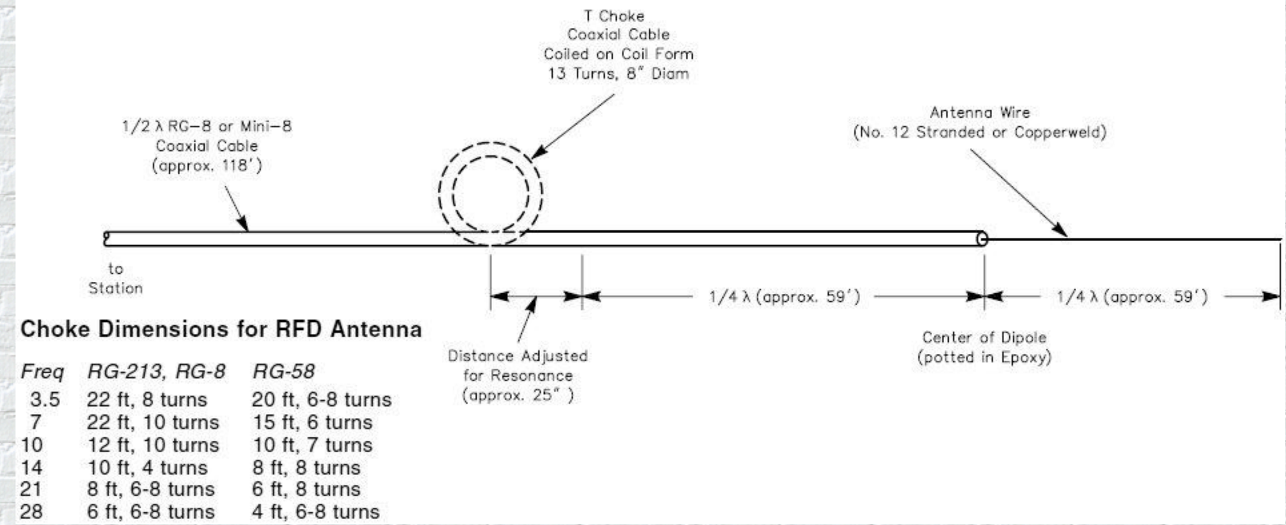
170 - Sloping Wire Antenna for 30m, 20m, 17m, 15m, 12m, 10m



171 - Broadband Dipole Antenna with Coaxial Resonator for 80m



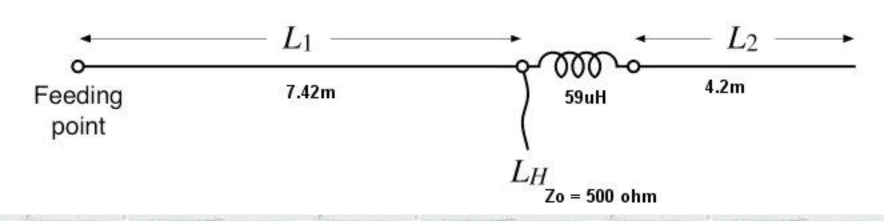
172 - Resonant Feedline Dipole Antenna for 80m



Choke Dimensions for RFD Antenna

Freq	*RG-213, RG-8*	*RG-58*
3.5	22 ft, 8 turns	20 ft, 6-8 turns
7	22 ft, 10 turns	15 ft, 6 turns
10	12 ft, 10 turns	10 ft, 7 turns
14	10 ft, 4 turns	8 ft, 8 turns
21	8 ft, 6-8 turns	6 ft, 8 turns
28	6 ft, 6-8 turns	4 ft, 6-8 turns

173 - Dual-Band Loading Wire Antenna for 80m, 30m



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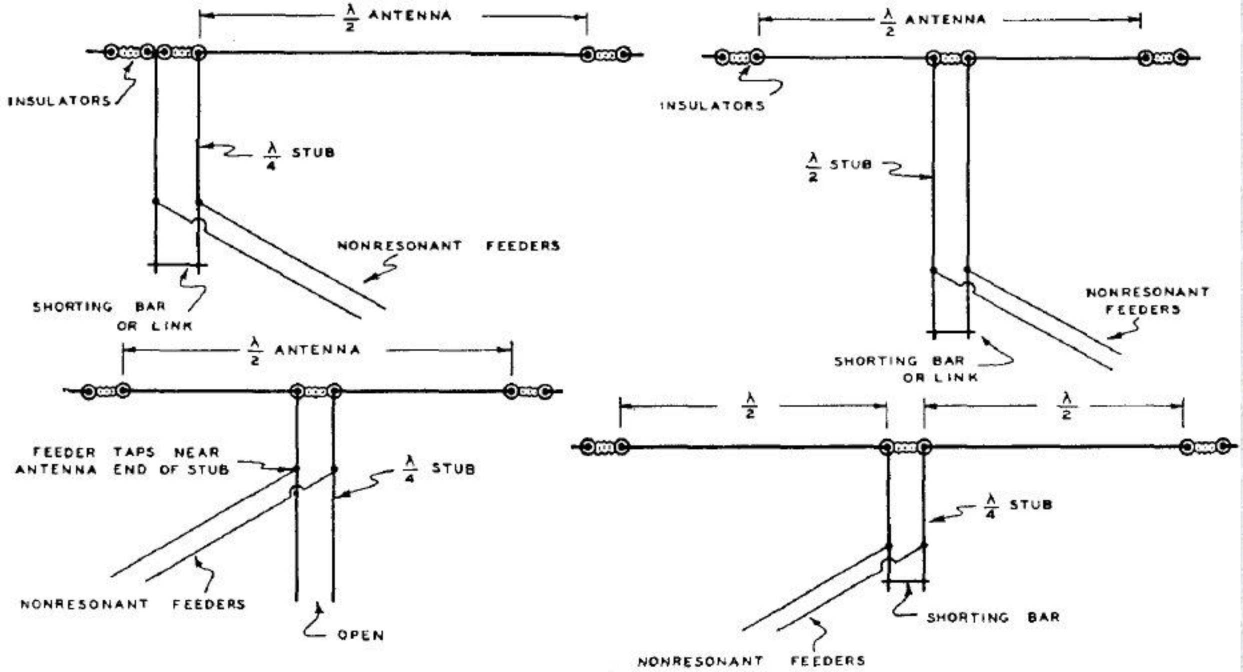
174 - Stub Matching Antennas



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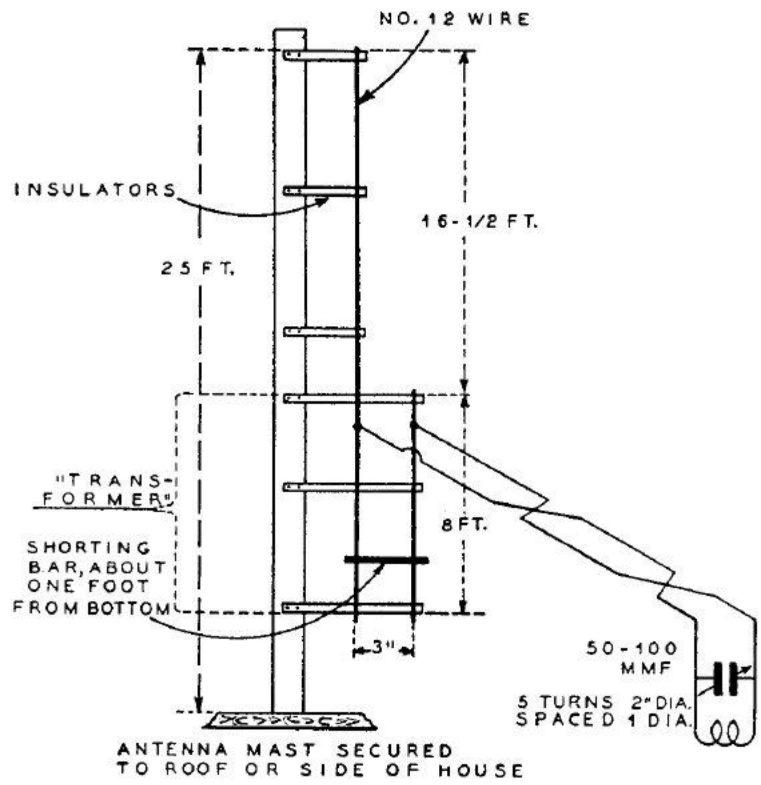
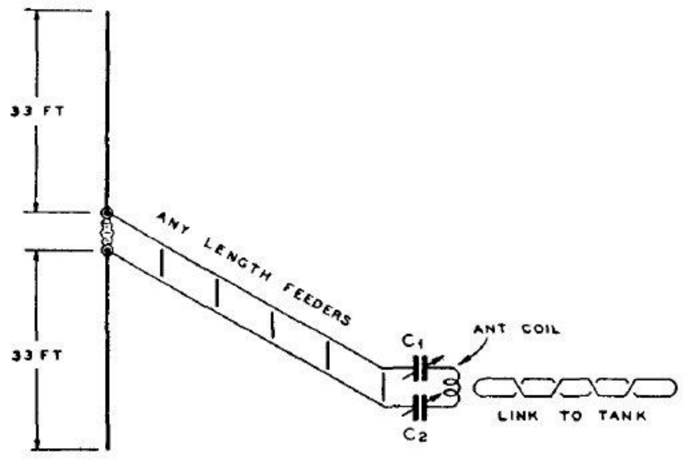
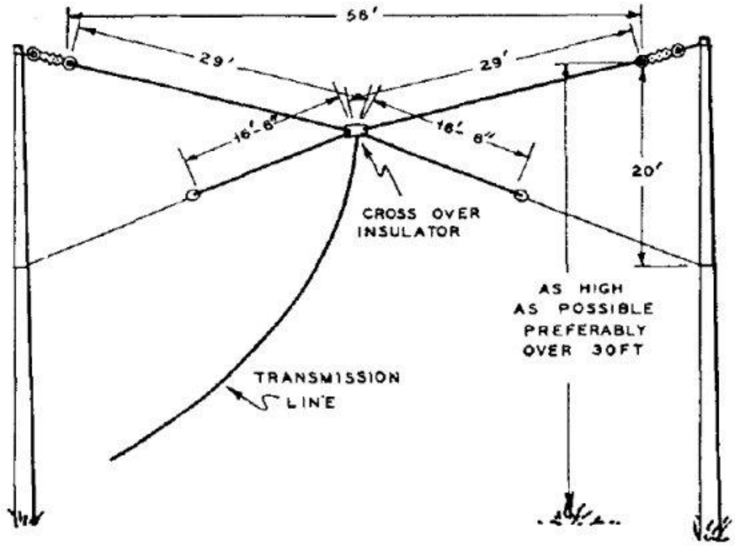
175 - J-Style Vertical Wire Antenna for 10m


NO. 12 WIRE
INSULATORS
16-1/2 FT.
25 FT.
"TRANS-FORMER"
8 FT.
SHORTING BAR, ABOUT ONE FOOT FROM BOTTOM
3"
50-100 MMF
5 TURNS 2" DIA. SPACED 1 DIA.
ANTENNA MAST SECURED TO ROOF OR SIDE OF HOUSE

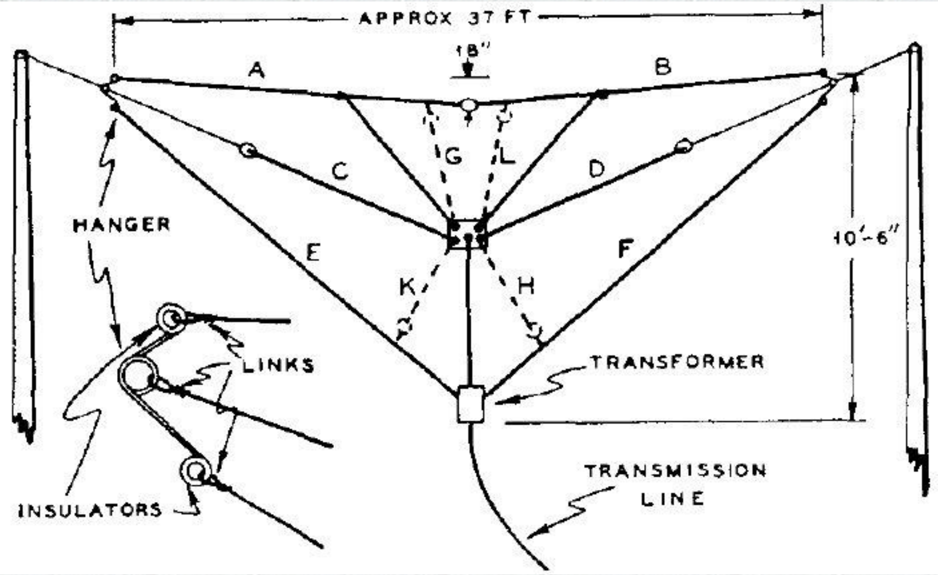
176 - Dual Band Vertical with Zepp Feeders for 40m, 20m



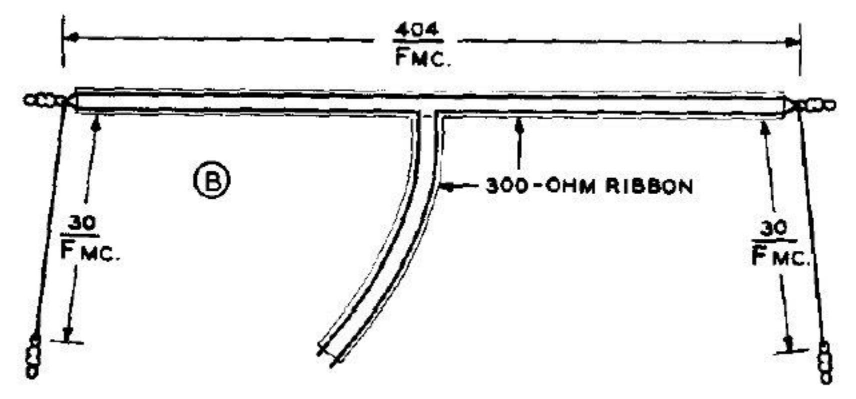
177 - RCA Double Doublet for 40m to 12m



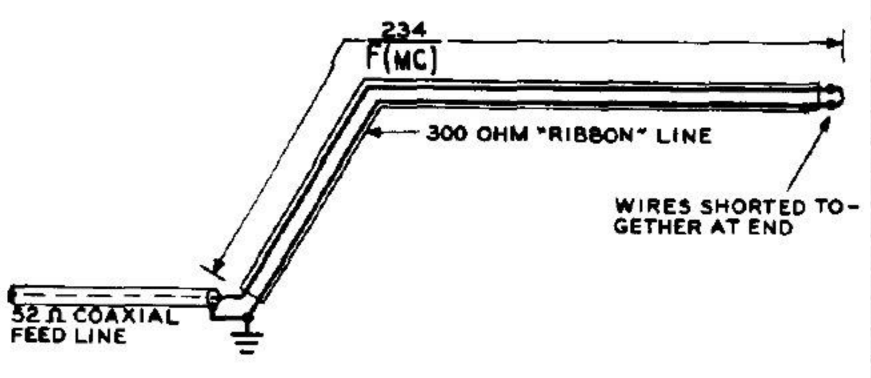
178 - RCA Spiderweb Antenna for 40m to 6m



179 - Folded Dipole with Shorted Straps



180 - Twin-Lead Marconi Antenna for 160m, 80m



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181 - Broadband Antenna Quarter-Wave Balun for 80m

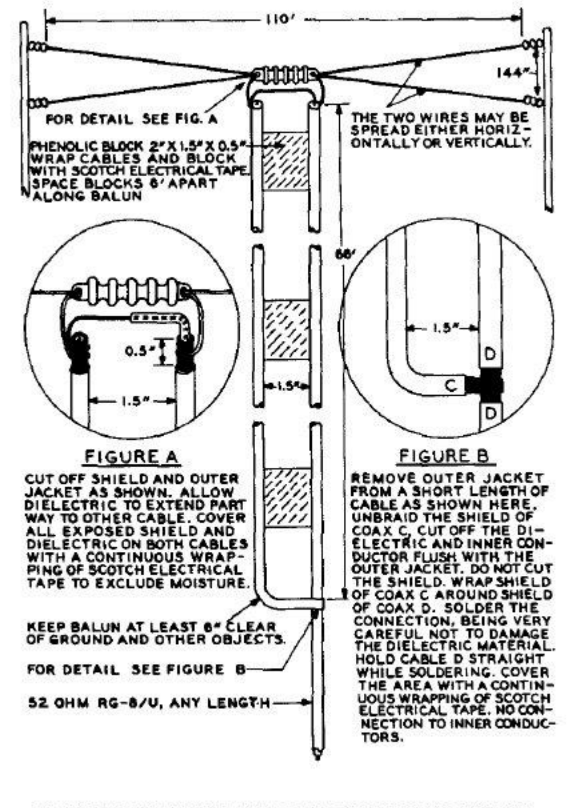
110'
144"
FOR DETAIL SEE FIG. A
THE TWO WIRES MAY BE SPREAD EITHER HORIZONTALLY OR VERTICALLY.
PHENOLIC BLOCK 2"X 1.5"X 0.5" WRAP CABLES AND BLOCK WITH SCOTCH ELECTRICAL TAPE. SPACE BLOCKS 6' APART ALONG BALUN
68'
0.5"
1.5"
1.5"
1.5"
C
D
D
KEEP BALUN AT LEAST 6" CLEAR OF GROUND AND OTHER OBJECTS.
FOR DETAIL SEE FIGURE B
52 OHM RG-8/U, ANY LENGTH

FIGURE A

CUT OFF SHIELD AND OUTER JACKET AS SHOWN. ALLOW DIELECTRIC TO EXTEND PART WAY TO OTHER CABLE. COVER ALL EXPOSED SHIELD AND DIELECTRIC ON BOTH CABLES WITH A CONTINUOUS WRAPPING OF SCOTCH ELECTRICAL TAPE TO EXCLUDE MOISTURE.

FIGURE B

REMOVE OUTER JACKET FROM A SHORT LENGTH OF CABLE AS SHOWN HERE. UNBRAID THE SHIELD OF COAX C, CUT OFF THE DIELECTRIC AND INNER CONDUCTOR FLUSH WITH THE OUTER JACKET. DO NOT CUT THE SHIELD. WRAP SHIELD OF COAX C AROUND SHIELD OF COAX D. SOLDER THE CONNECTION, BEING VERY CAREFUL NOT TO DAMAGE THE DIELECTRIC MATERIAL. HOLD CABLE D STRAIGHT WHILE SOLDERING. COVER THE AREA WITH A CONTINUOUS WRAPPING OF SCOTCH ELECTRICAL TAPE. NO CONNECTION TO INNER CONDUCTORS.

DIMENSIONS SHOWN HERE ARE FOR THE 80 METER BAND. THIS ANTENNA MAY BE BUILT FOR OTHER BANDS BY USING DIMENSIONS THAT ARE MULTIPLES OR SUBMULTIPLES OF THE DIMENSIONS SHOWN. BALUN SPACING IS 1.5" ON ALL BANDS.

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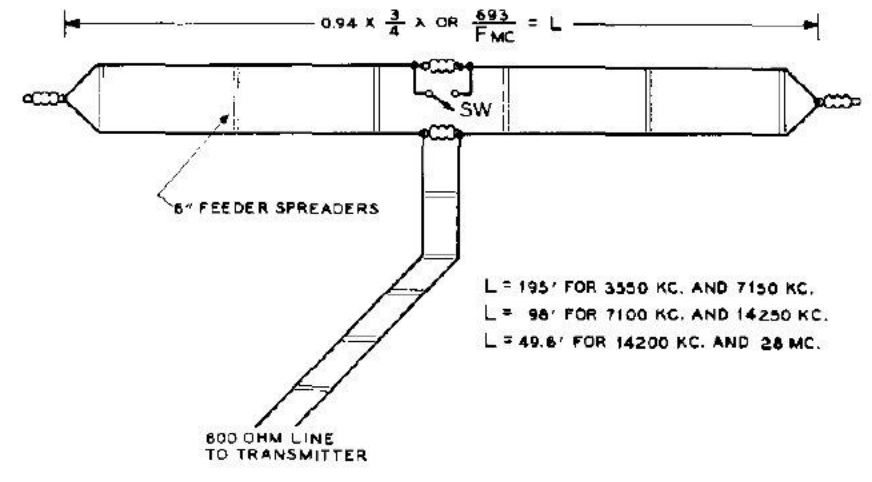
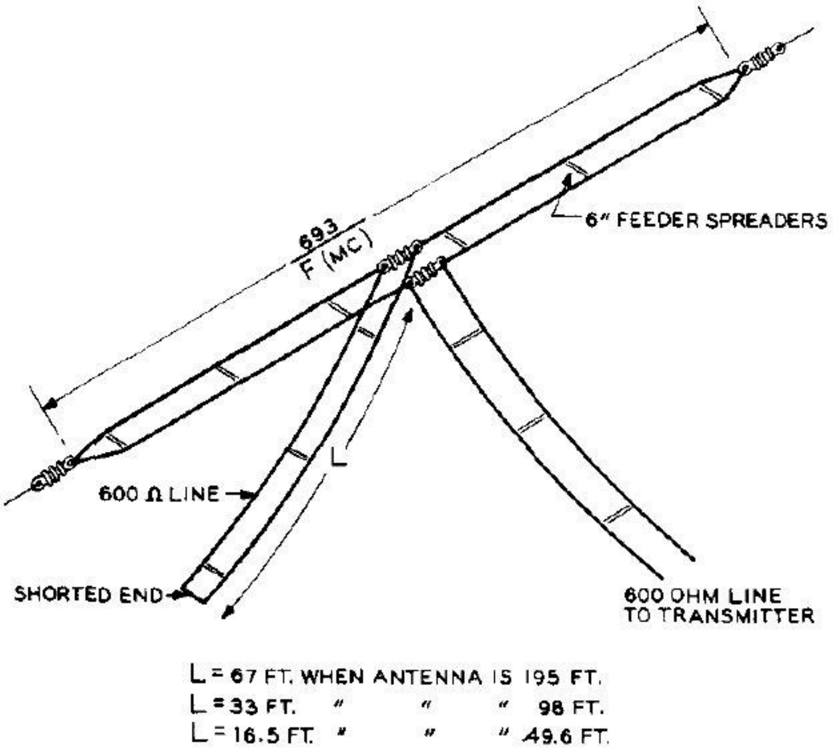
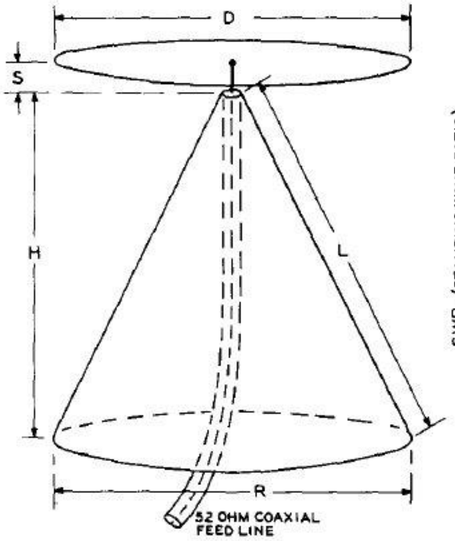
182 - Three-Quarter-Wave Folded Doublet for Dual-Band

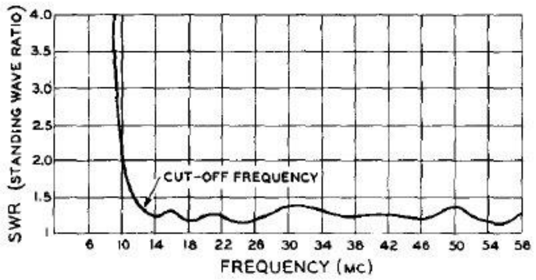

0.94 x 3/4 λ OR 693/F MC = L
SW
6" FEEDER SPREADERS
L = 195' FOR 3550 KC. AND 7150 KC.
L = 98' FOR 7100 KC. AND 14250 KC.
L = 49.6' FOR 14200 KC. AND 28 MC.
600 OHM LINE
TO TRANSMITTER

183 - Three-Quarter-Wave Folded Doublet No-Switch for Dual-Band



184 - Wideband Omni-Directional Discone Antenna

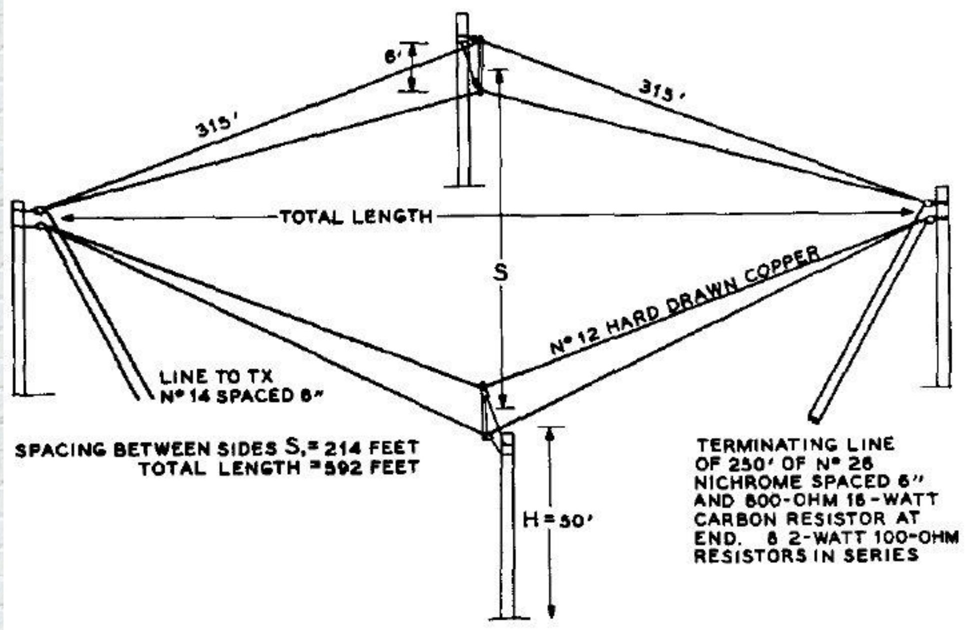




DIMENSIONS

20, 15, 11, 10, 6 METERS	15, 11, 10, 6 METERS	11, 10, 6, 2 METERS
D= 12′ L= 18′	D= 8′ L= 12′	D= 6′ L= 9′6″
S= 10″ R= 18′	S= 6″ R= 12′	S= 4″ R= 9′6″
H= 15′ 7″	H= 10′ 5″	H= 8′ 3″

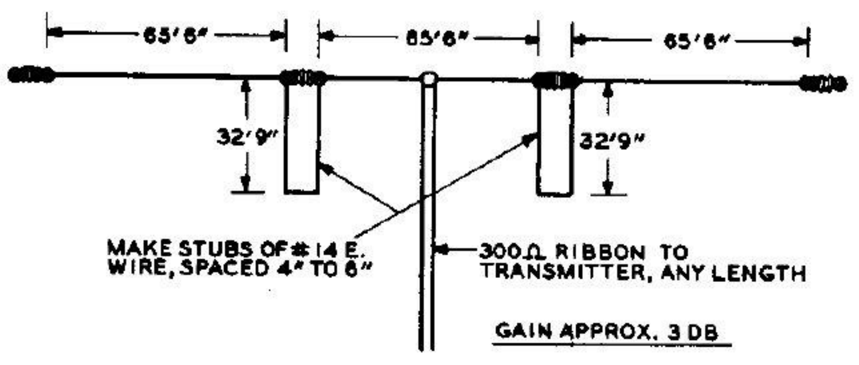
185 - Wideband Rhombic Antenna for 40m to 10m



SPACING BETWEEN SIDES S, = 214 FEET
TOTAL LENGTH = 592 FEET

TERMINATING LINE
OF 250′ OF Nº 26
NICHROME SPACED 6″
AND 800-OHM 16-WATT
CARBON RESISTOR AT
END. 8 2-WATT 100-OHM
RESISTORS IN SERIES

186 - Pre-Cut Linear Array Antenna 3dB-Gain for 40m

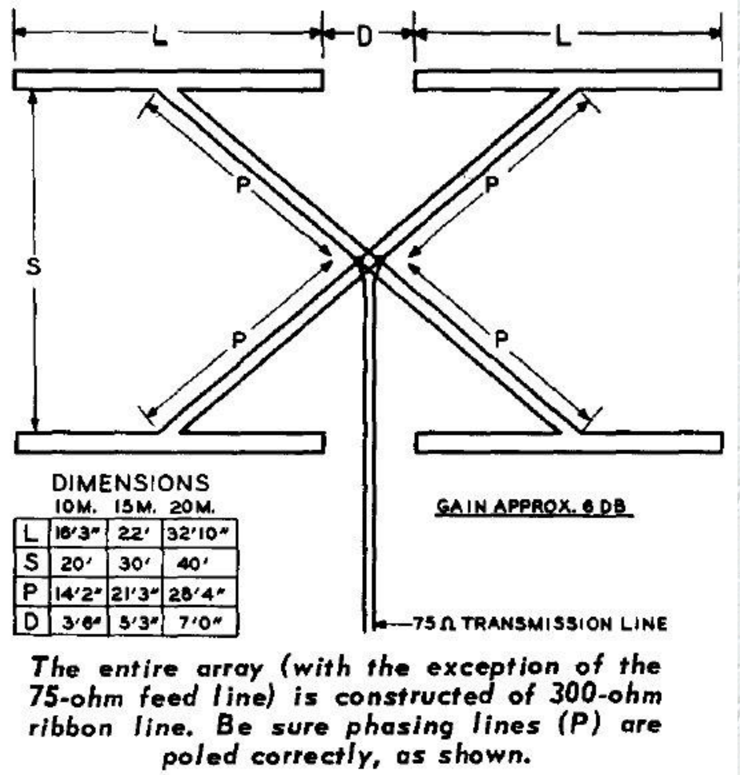


MAKE STUBS OF # 14 E. WIRE, SPACED 4″ TO 6″

300Ω RIBBON TO TRANSMITTER, ANY LENGTH

GAIN APPROX. 3 DB

187 - X-Array Antenna 6dB-Gain for 20m, 15m, 10m

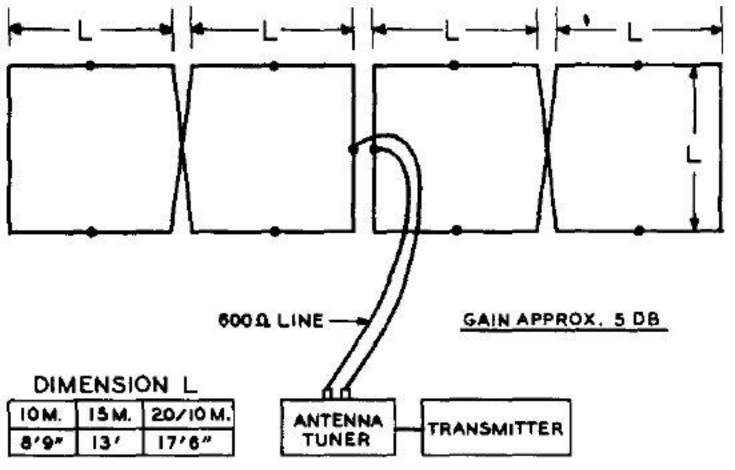


DIMENSIONS

	10M.	15M.	20M.
L	16'3"	22'	32'10"
S	20'	30'	40'
P	14'2"	21'3"	28'4"
D	3'6"	5'3"	7'0"

The entire array (with the exception of the 75-ohm feed line) is constructed of 300-ohm ribbon line. Be sure phasing lines (P) are poled correctly, as shown.

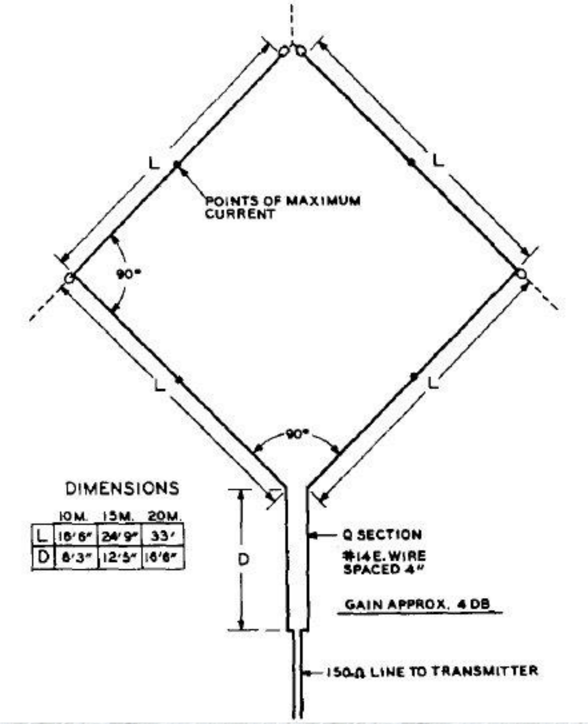
188 - Double-Bruce Array Antenna 5dB-Gain for 20m, 10m



DIMENSION L

10M.	15M.	20/10 M.
8'9"	13'	17'6"

189 - Bi-Square Broadside Array 4dB-Gain for 20m, 15m, 10m



DIMENSIONS

	10M.	15M.	20M.
L	16'6"	24'9"	33'
D	8'3"	12'5"	16'6"

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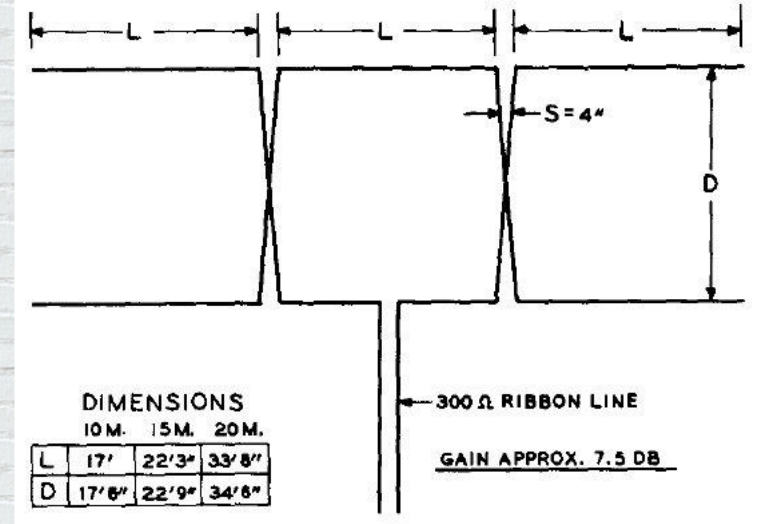
190 - Six-Shooter Broadside Array 7.5dB-Gain for 20m, 15m, 10m

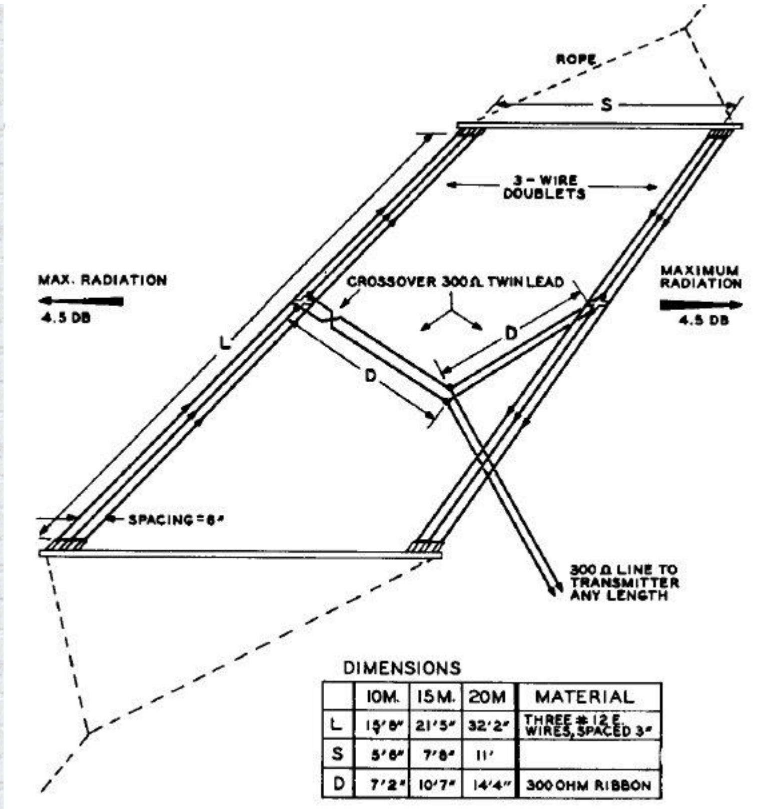


DIMENSIONS

	10M.	15M.	20M.
L	17'	22'3"	33'8"
D	17'6"	22'9"	34'6"

---

191 - Triplex Flat-Top Beam 4.5dB-Gain for 20m, 15m, 10m



DIMENSIONS

	10M.	15M.	20M	MATERIAL
L	15'8"	21'5"	32'2"	THREE # 12 E. WIRES, SPACED 3"
S	5'6"	7'8"	11'	
D	7'2"	10'7"	14'4"	300 OHM RIBBON

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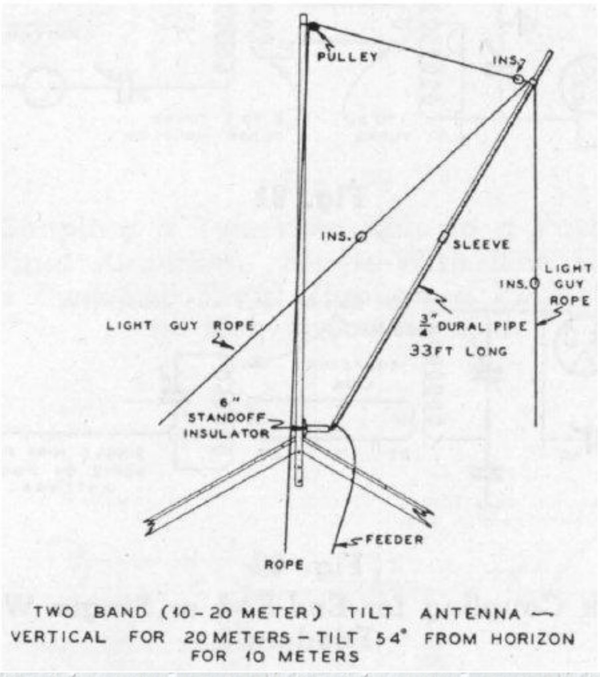
192 - Dual-Band Tilt Antenna for 20m, 10m



TWO BAND (10-20 METER) TILT ANTENNA — VERTICAL FOR 20 METERS - TILT 54° FROM HORIZON FOR 10 METERS

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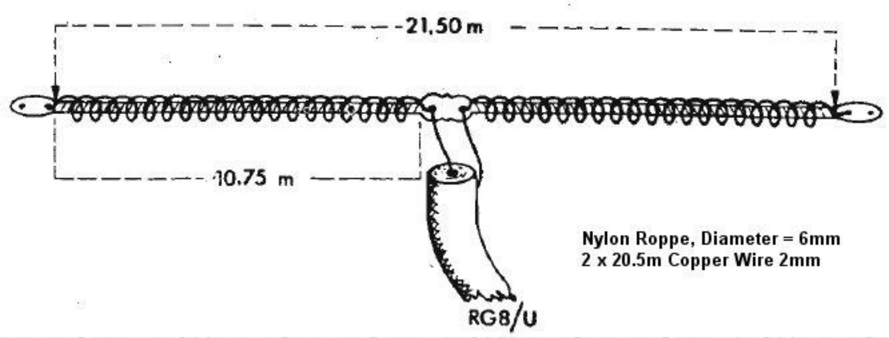
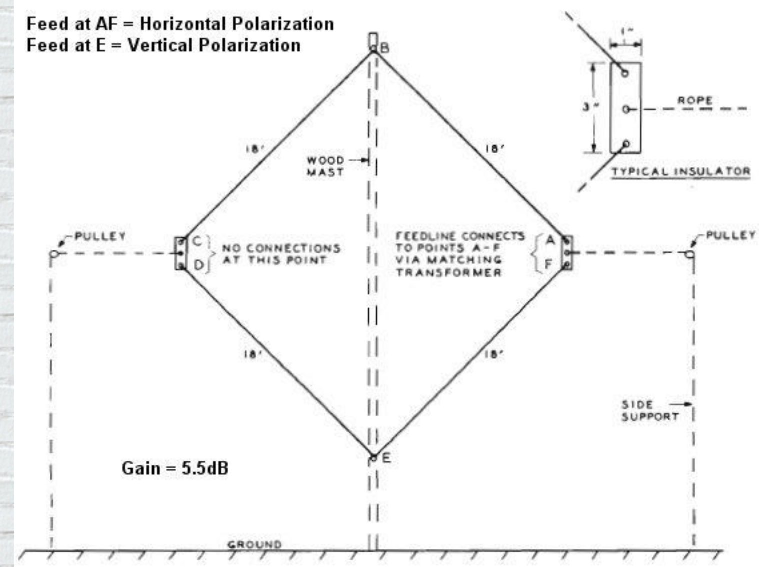
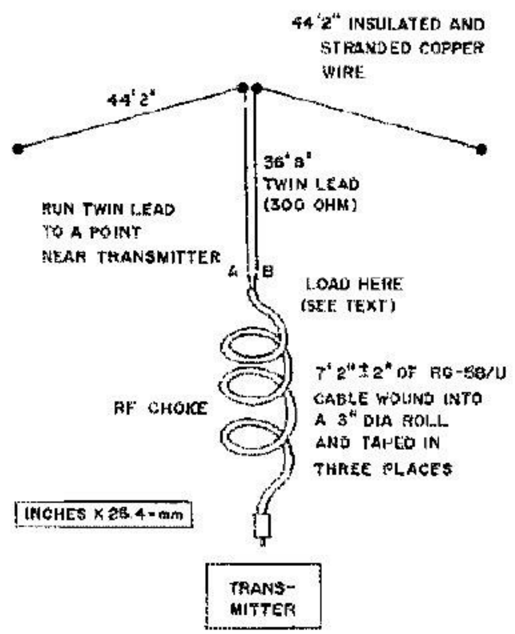
193 - Super Space Multiband Dipole Antenna for 80m to 10m



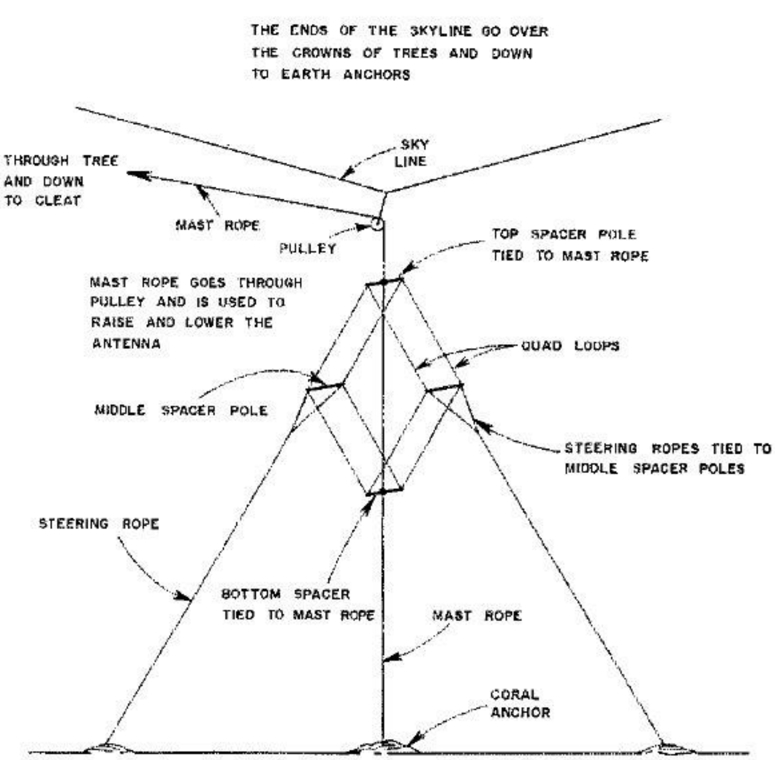
194 - Bi-Square Beam Antenna Gain=5.5dB for 10m


Feed at AF = Horizontal Polarization
Feed at E = Vertical Polarization
B
18'
18'
WOOD MAST
1"
3"
ROPE
TYPICAL INSULATOR
PULLEY
C
D
NO CONNECTIONS AT THIS POINT
FEEDLINE CONNECTS TO POINTS A-F VIA MATCHING TRANSFORMER
A
F
PULLEY
18'
18'
SIDE SUPPORT
E
Gain = 5.5dB
GROUND

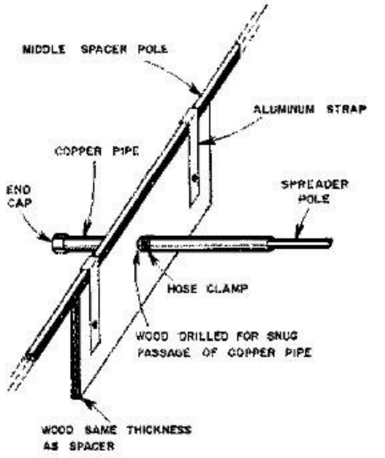
195 - Cousin of G5RV Multiband Antenna for 40m to 10m

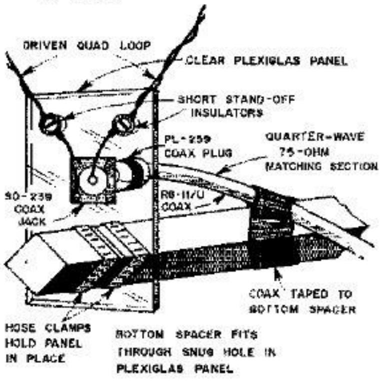

44'2" INSULATED AND STRANDED COPPER WIRE
44'2"
36'8" TWIN LEAD (300 OHM)
RUN TWIN LEAD TO A POINT NEAR TRANSMITTER
A
B
LOAD HERE (SEE TEXT)
7'2"±2" OF RG-58/U CABLE WOUND INTO A 3" DIA ROLL AND TAPED IN THREE PLACES
RF CHOKE
INCHES X 25.4=mm
TRANS-MITTER

196 - Cayman Quad Antenna for 20m

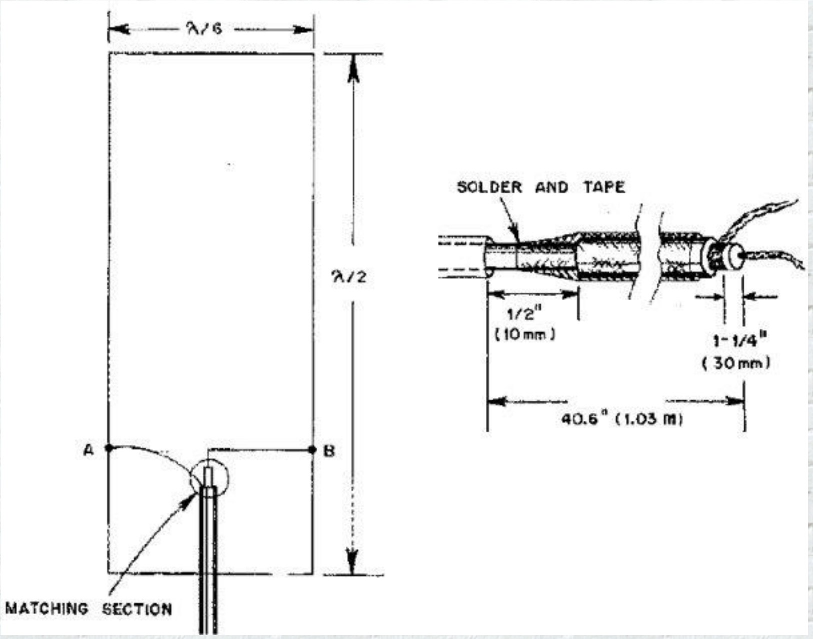

THE ENDS OF THE SKYLINE GO OVER THE CROWNS OF TREES AND DOWN TO EARTH ANCHORS
SKY LINE
THROUGH TREE AND DOWN TO CLEAT
MAST ROPE
PULLEY
TOP SPACER POLE TIED TO MAST ROPE
MAST ROPE GOES THROUGH PULLEY AND IS USED TO RAISE AND LOWER THE ANTENNA
QUAD LOOPS
MIDDLE SPACER POLE
STEERING ROPES TIED TO MIDDLE SPACER POLES
STEERING ROPE
BOTTOM SPACER TIED TO MAST ROPE
MAST ROPE
CORAL ANCHOR

Length of one side of driven radiator: 250/f = 17.86 ft.
Length of one side of closed reflector: 258/f = 18.43 ft.
Spacing between loops: 118/f = 8.43 ft.

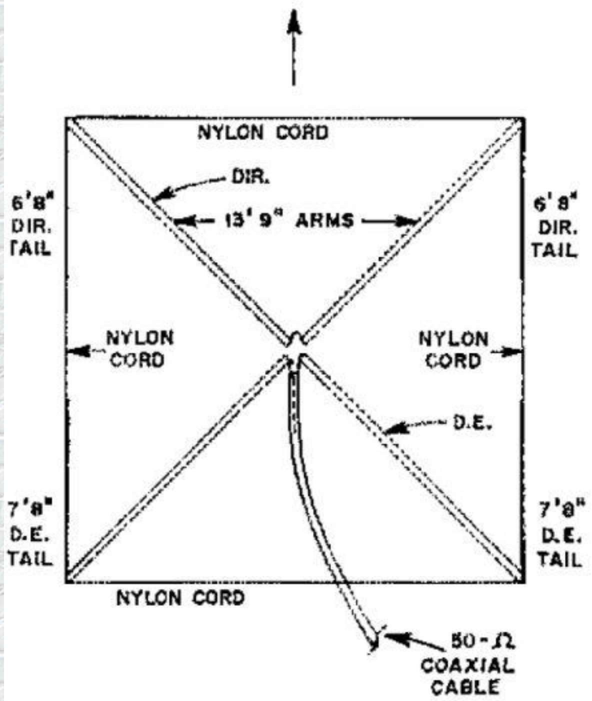

MIDDLE SPACER POLE
ALUMINUM STRAP
COPPER PIPE
END CAP
SPREADER POLE
HOSE CLAMP
WOOD DRILLED FOR SNUG PASSAGE OF COPPER PIPE
WOOD SAME THICKNESS AS SPACER


DRIVEN QUAD LOOP
CLEAR PLEXIGLAS PANEL
SHORT STAND-OFF INSULATORS
PL-259 COAX PLUG
QUARTER-WAVE 75-OHM MATCHING SECTION
SO-239 COAX JACK
RG-11/U COAX
COAX TAPED TO BOTTOM SPACER
HOSE CLAMPS HOLD PANEL IN PLACE
BOTTOM SPACER FITS THROUGH SNUG HOLE IN PLEXIGLAS PANEL

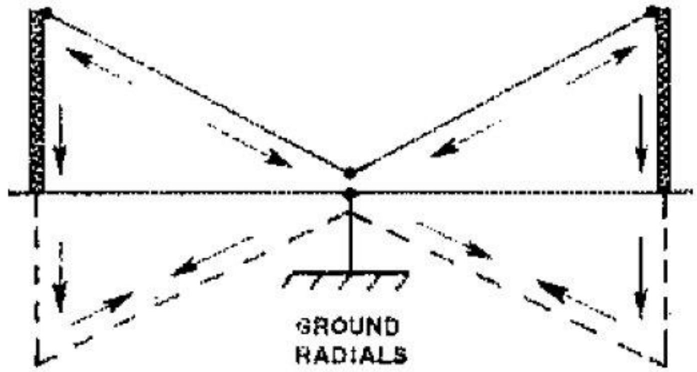
197 - Hentenna Gain=3dB with Bazooka Match for 6m



198 - X-Beam Antenna Gain=3dB for 20m



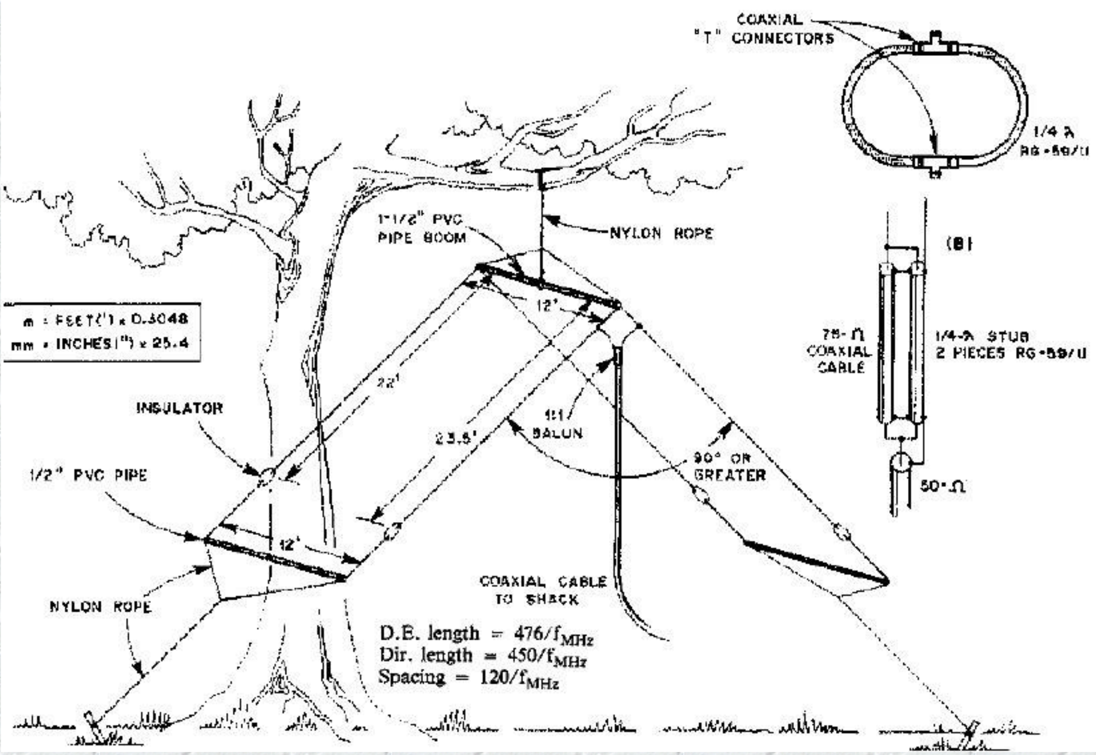
199 - Twin Delta Loop Antenna Gain=6dB for 160m, 80m, 40m



Twin- Delta Loop, with the image in the ground plane.

Band	*Tower Height (ft)*	*Length of Sloping Wires (ft)*
160 m†	102.03	204.06
80 m	49.86	99.72
40 m	25.92	51.84

200 - Inverted-V Beam Antenna for 30m



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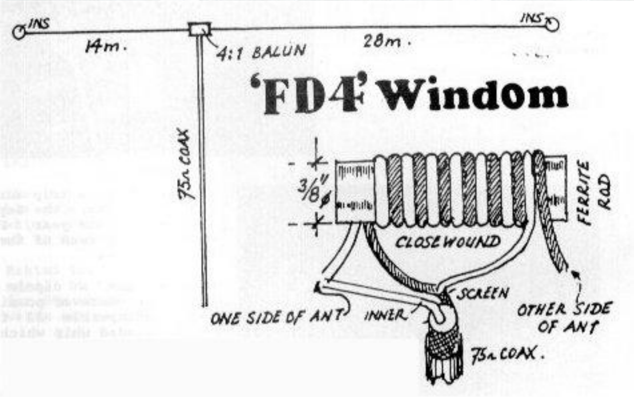
201 - FD4 Windom Antenna for 80m, 40m, 20m, 10m



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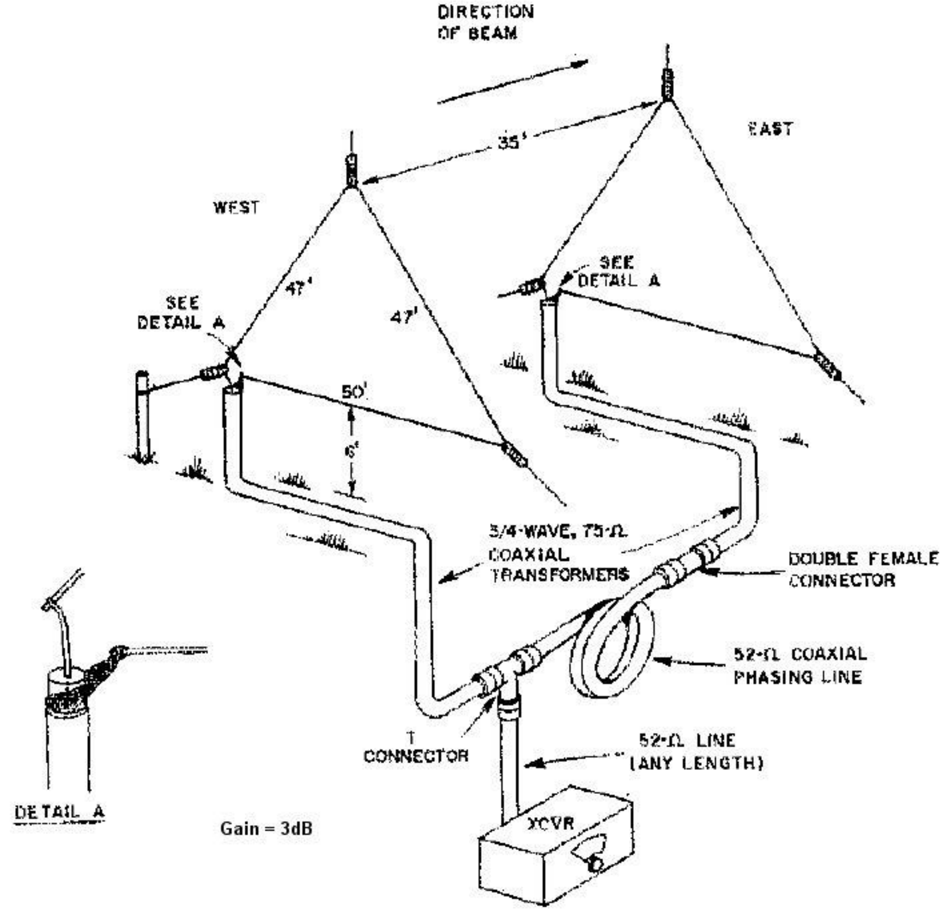
202 - Two Elements Phased Delta Loop for 40m



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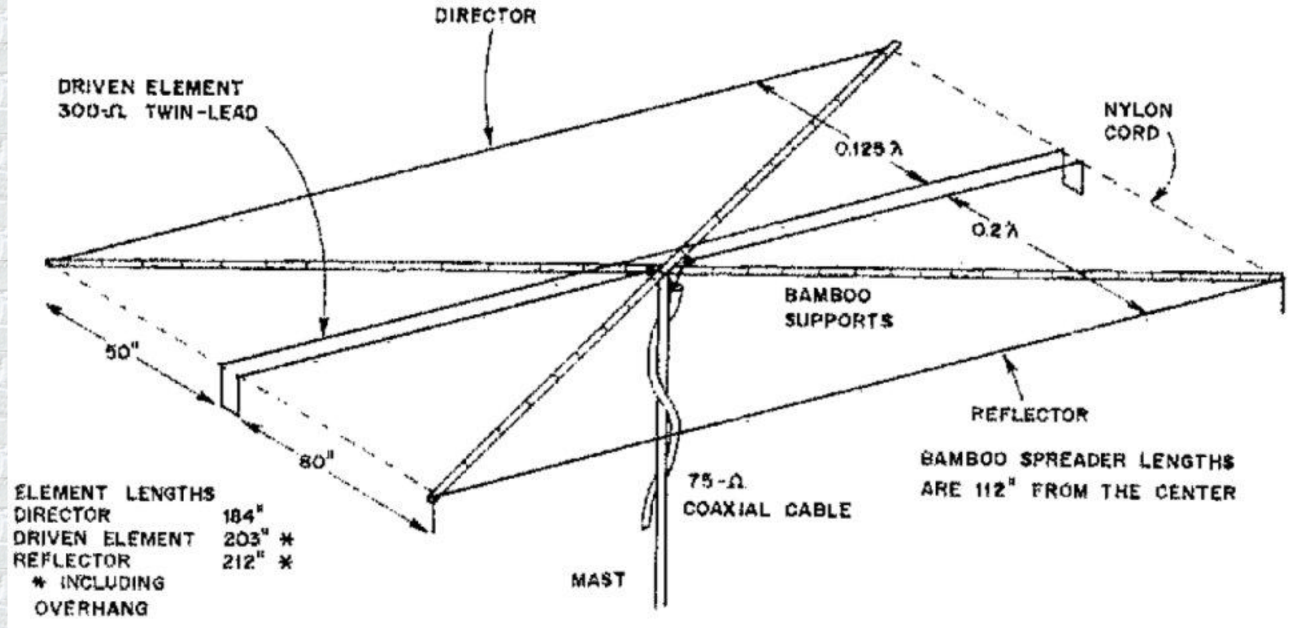
203 - Three Elements Wire Yagi for 10m



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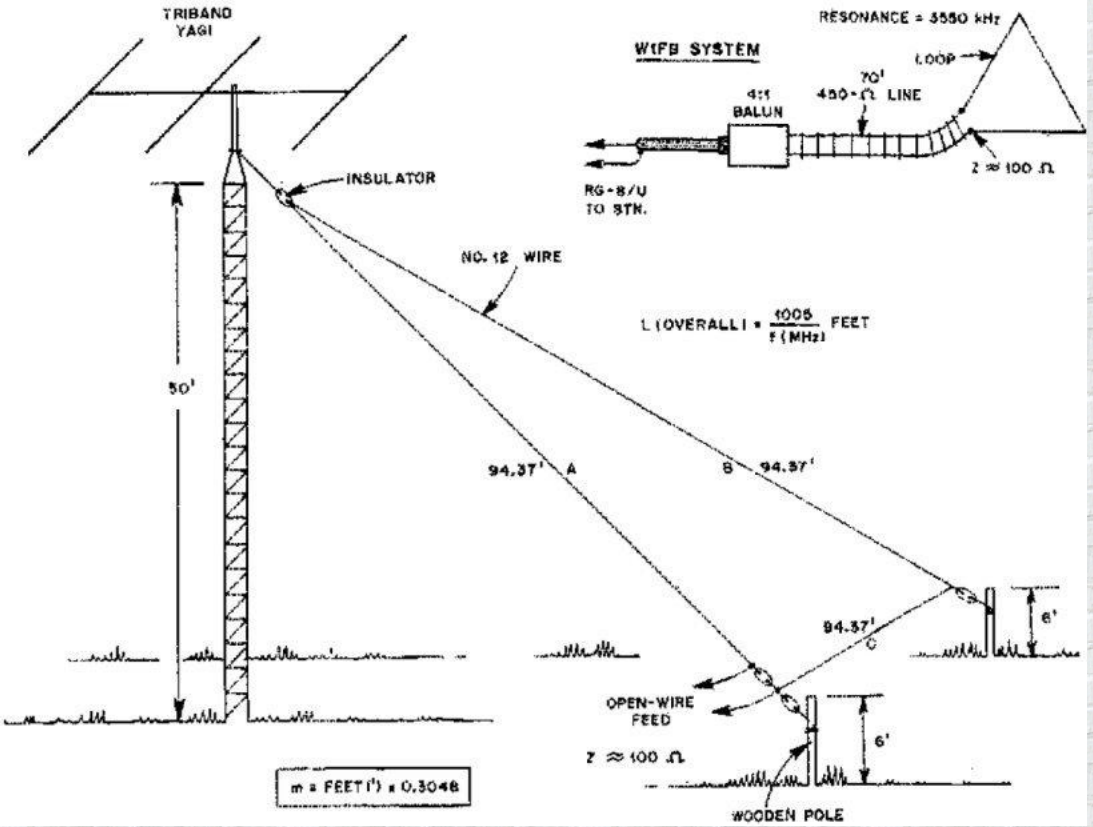
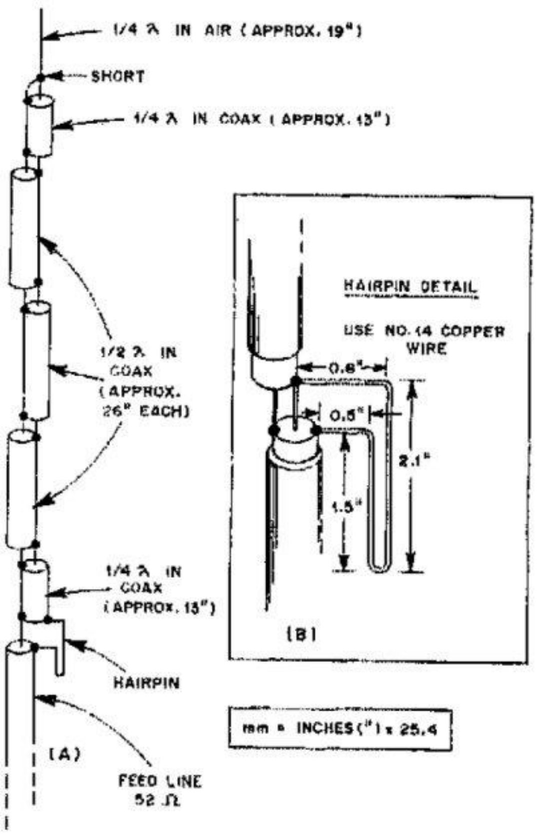
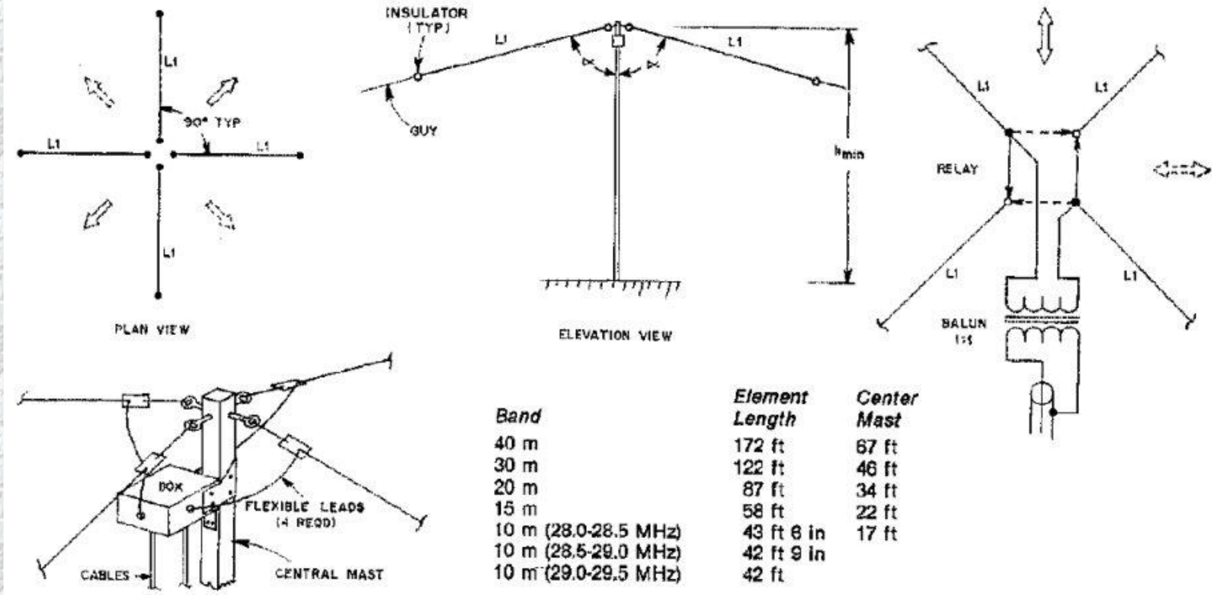
204 - Low Radiation Angle Full-Wave Loop Antenna for 80m



205 - Collinear Antenna Gain=3dB for 2m


1/4 λ IN AIR (APPROX. 19")
SHORT
1/4 λ IN COAX (APPROX. 13")
1/2 λ IN COAX (APPROX. 26" EACH)
1/4 λ IN COAX (APPROX. 13")
HAIRPIN
(A)
FEED LINE 52 Ω
HAIRPIN DETAIL
USE NO. 14 COPPER WIRE
0.8"
0.5"
2.1"
1.5"
(B)
mm = INCHES(") x 25.4

206 - X-Ray Monoband Antenna Gain=6.5dBd



Band	Element Length	Center Mast
40 m	172 ft	67 ft
30 m	122 ft	46 ft
20 m	87 ft	34 ft
15 m	58 ft	22 ft
10 m (28.0-28.5 MHz)	43 ft 6 in	17 ft
10 m (28.5-29.0 MHz)	42 ft 9 in	
10 m (29.0-29.5 MHz)	42 ft	

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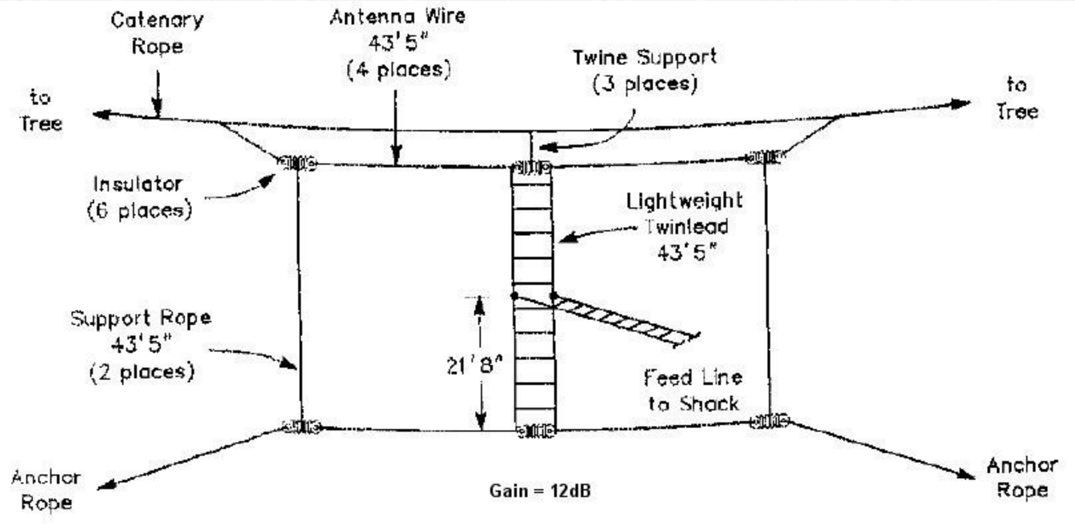
207 - Broadside Collinear Curtain Array for 20m



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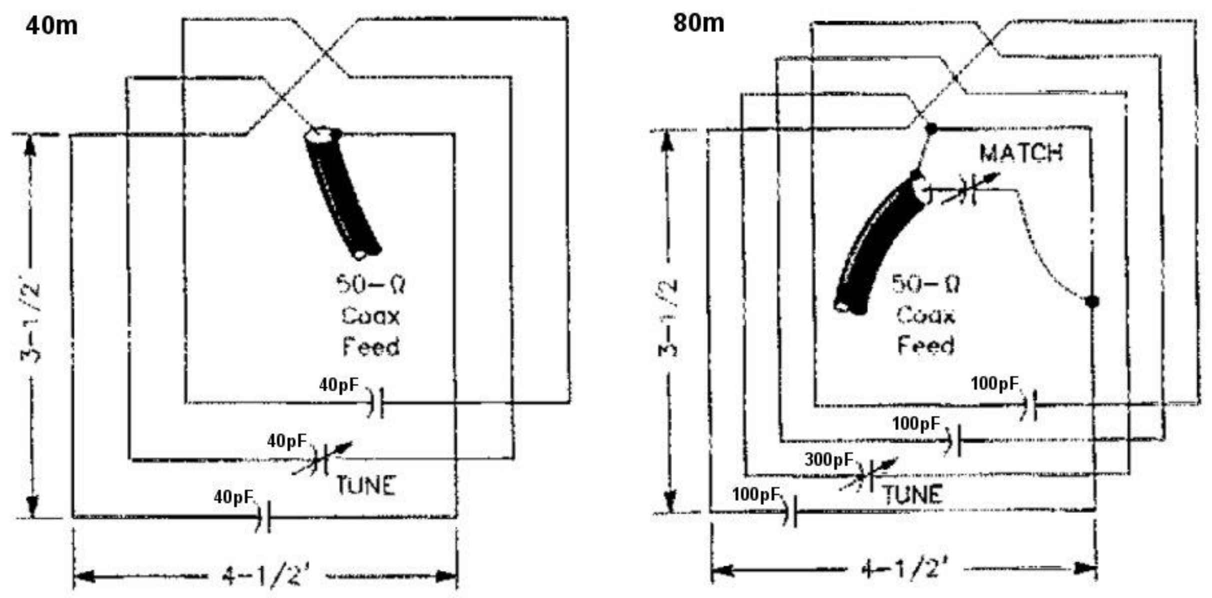
208 - Shrunk Loop Antenna for 80m, 40m



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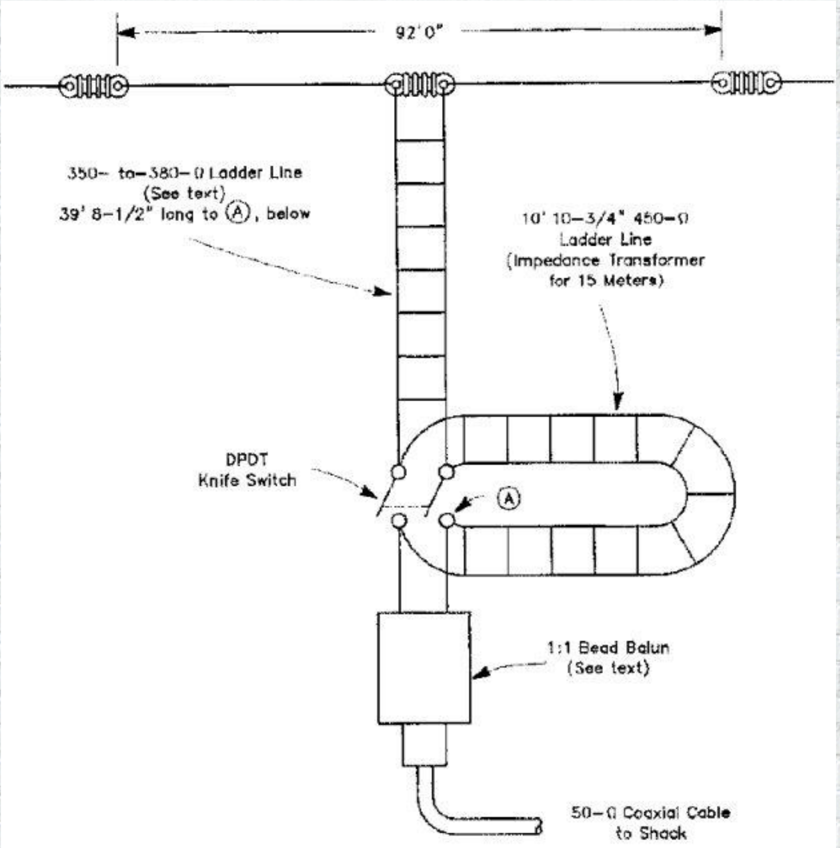
209 - λ/3 Multiband Dipole for 40m, 20m, 17m, 15m, 13m, 10m



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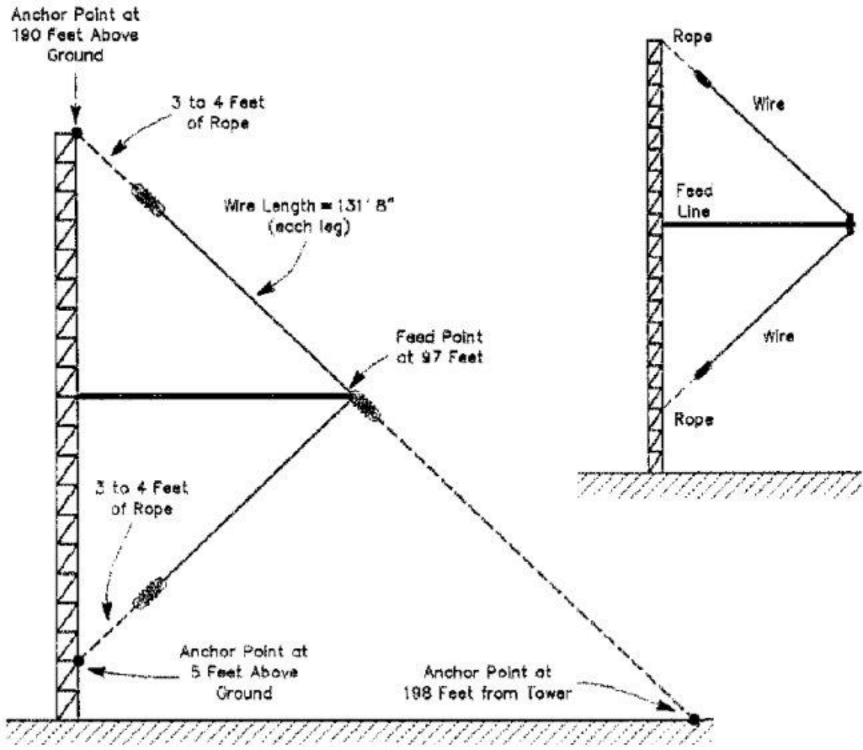
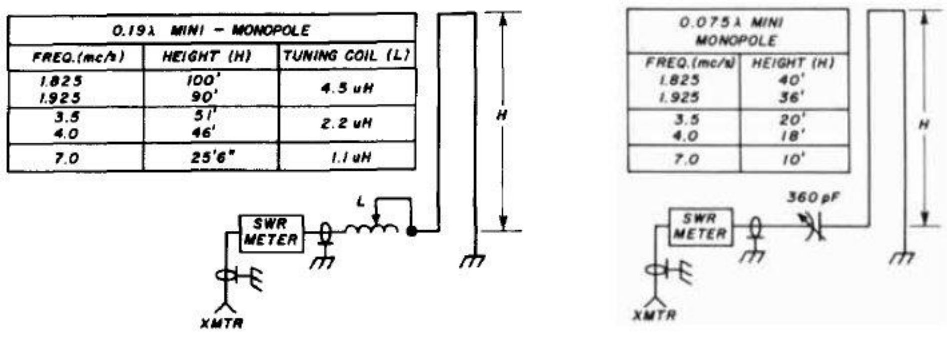
210 - K3LR Sloper Antenna Gain=3dB for 160m



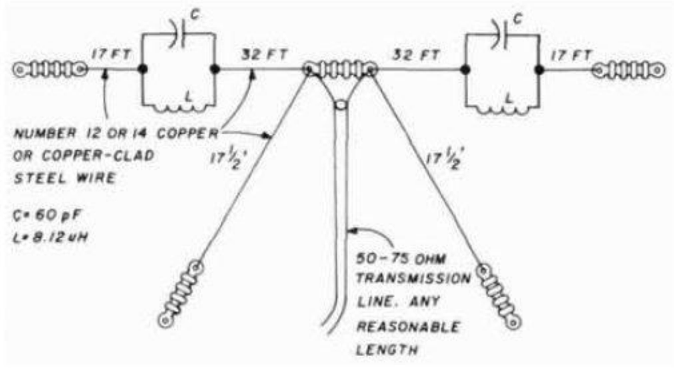
211 - Mini Folded Vertical Monopole Antenna for 160m, 80m, 40m



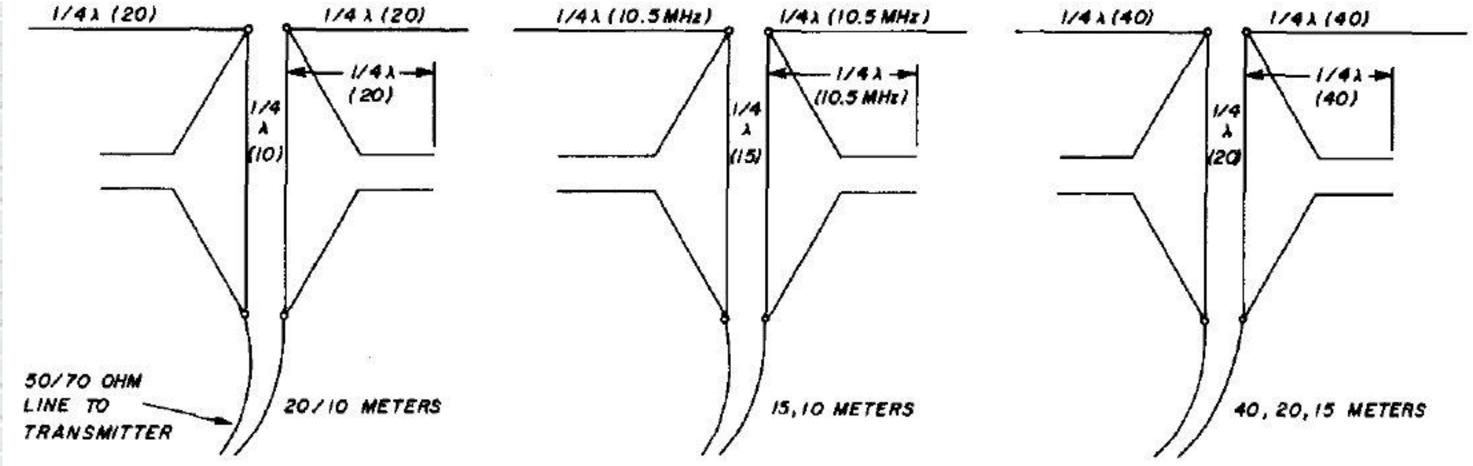
0.19λ MINI – MONOPOLE		
FREQ.(mc/s)	HEIGHT (H)	TUNING COIL (L)
1.825 1.925	100' 90'	4.5 uH
3.5 4.0	51' 46'	2.2 uH
7.0	25'6"	1.1 uH

0.075λ MINI MONOPOLE	
FREQ.(mc/s)	HEIGHT (H)
1.825 1.925	40' 36'
3.5 4.0	20' 18'
7.0	10'

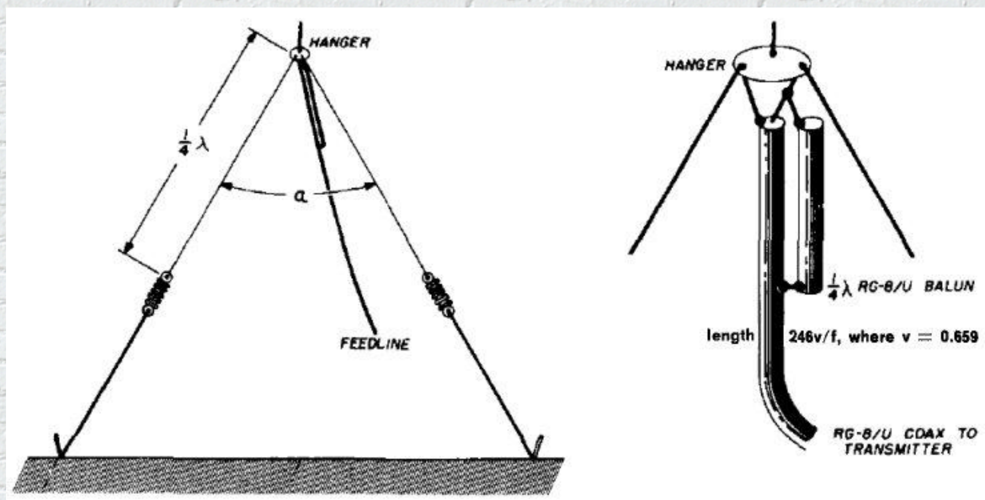
212 - Three Band Dipole for 80m, 40m, 20m



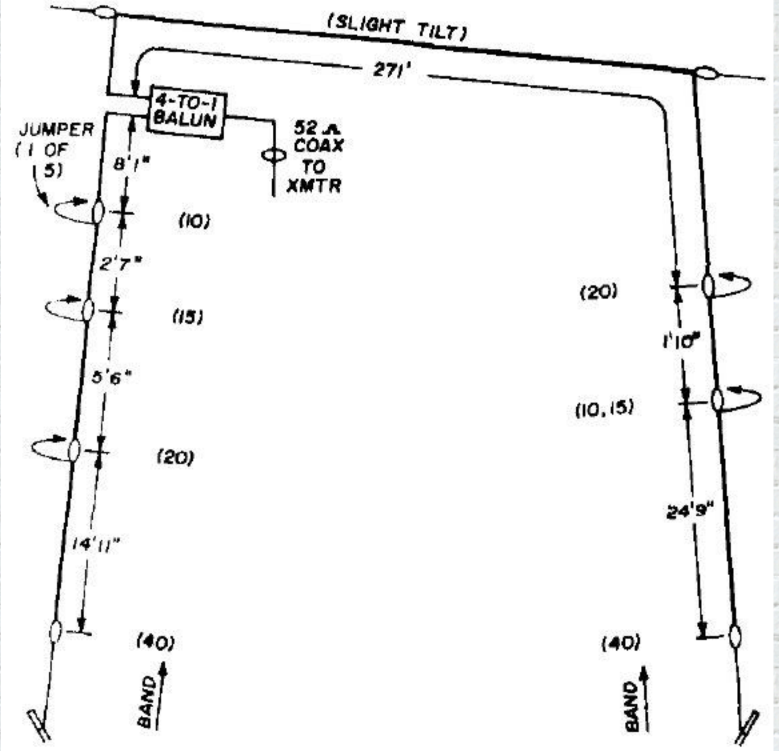
213 - Stub Matched Dipole Antenna



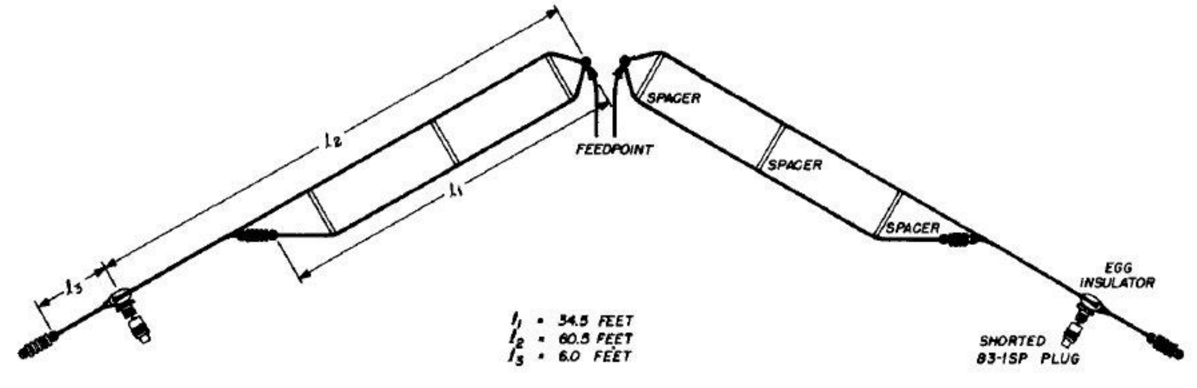
214 - Inverted-Vee Antenna with Bazooka Match


HANGER
$\frac{1}{4}\lambda$
a
FEEDLINE
HANGER
$\frac{1}{4}\lambda$ RG-8/U BALUN
length 246v/f, where v = 0.659
RG-8/U COAX TO TRANSMITTER

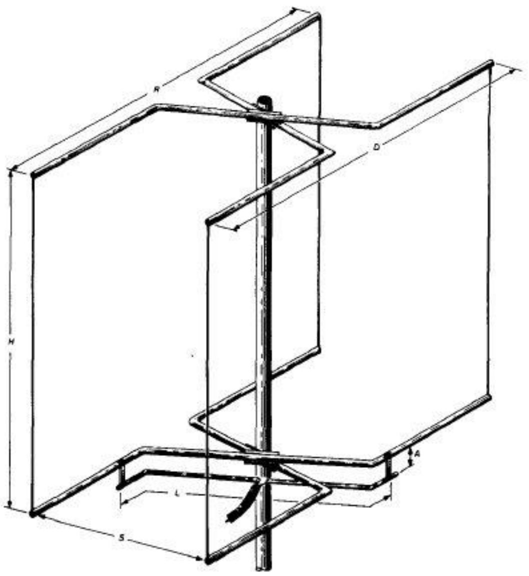
215 - Multiband Long Wire Antenna for 40m, 20m, 15m, 10m

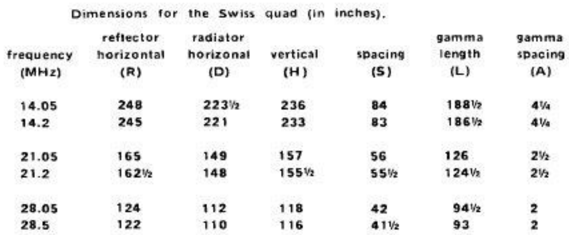


216 - Converted Vee Antenna for 80m, 40m



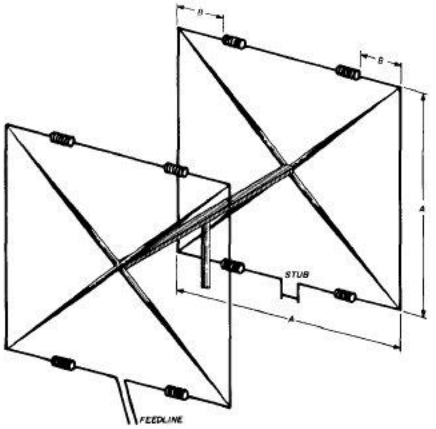
217 - Swiss Quad Antenna for 20m, 15m, 10m



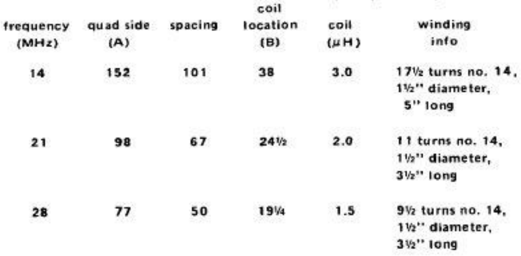

Dimensions for the Swiss quad (in inches).

frequency (MHz)	reflector horizontal (R)	radiator horizonal (D)	vertical (H)	spacing (S)	gamma length (L)	gamma spacing (A)
14.05	248	223½	236	84	188½	4¼
14.2	245	221	233	83	186½	4⅛
21.05	165	149	157	56	126	2½
21.2	162½	148	155½	55½	124½	2½
28.05	124	112	118	42	94½	2
28.5	122	110	116	41½	93	2

218 - Japanese Quad Antenna for 20m, 15m, 10m

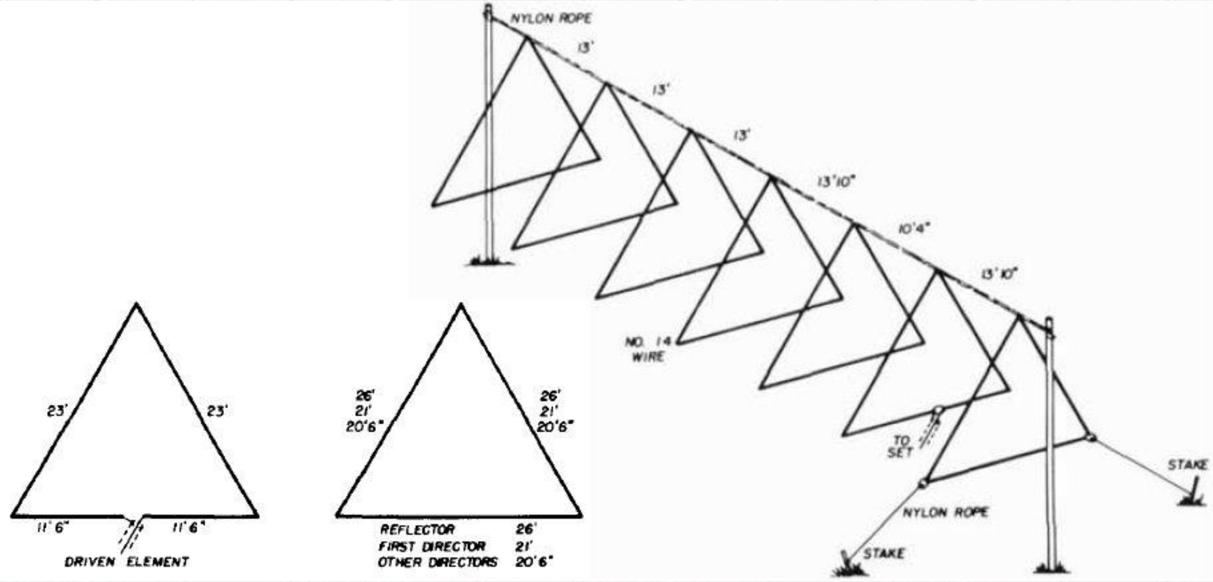


Construction details of the Japanese quad (in inches).

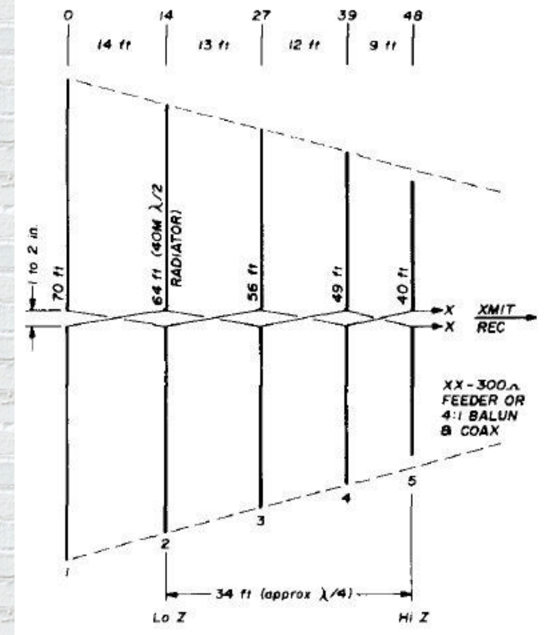


frequency (MHz)	quad side (A)	spacing	coil location (B)	coil (μH)	winding info
14	152	101	38	3.0	17½ turns no. 14, 1½" diameter, 5" long
21	98	67	24½	2.0	11 turns no. 14, 1½" diameter, 3½" long
28	77	50	19¼	1.5	9½ turns no. 14, 1½" diameter, 3½" long

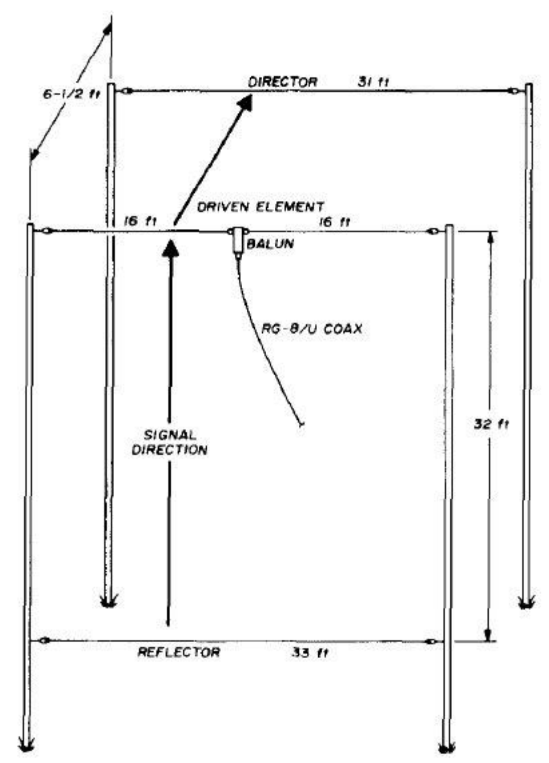
219 - Seven-Elements Triangle Beam Antenna for 20m



220 - Log Periodic Wire Antenna for 40m



221 - Three-Elements 90-degrees Wire Beam for 20m



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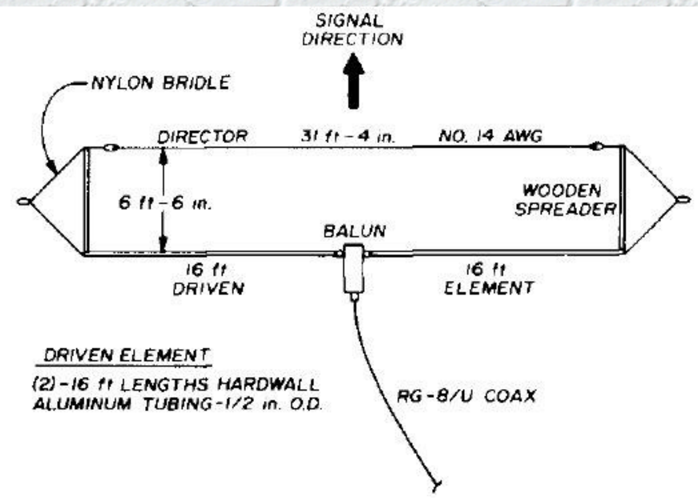
222 - Two-Elements Wire Beam for 20m



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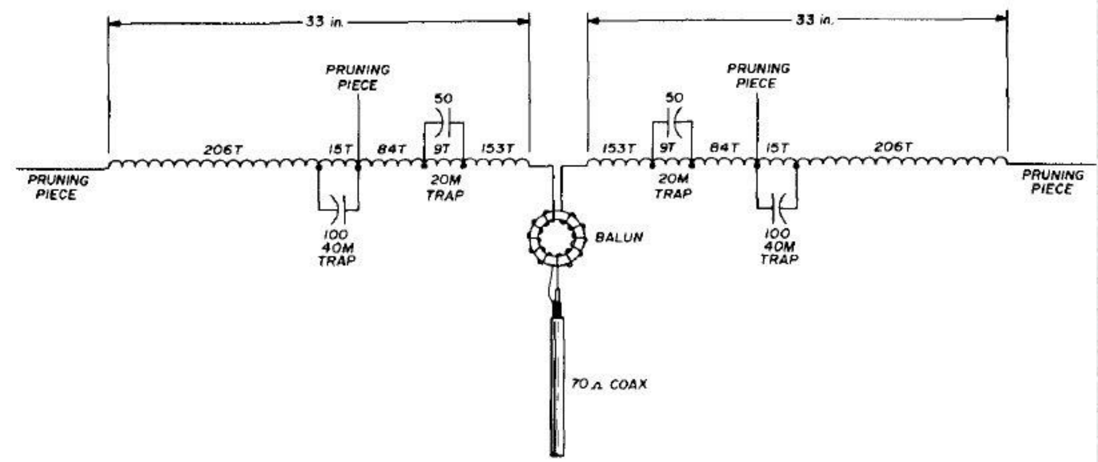
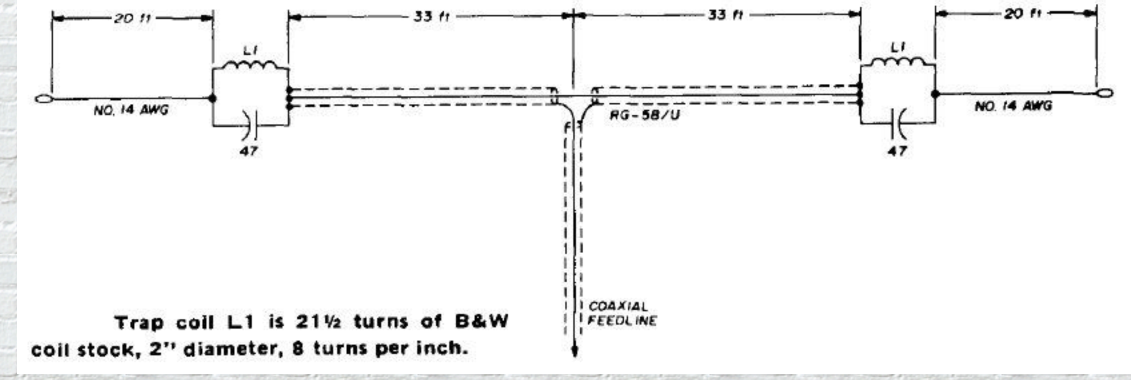
223 - Suitcase-Fit Dipole Antenna for 80m, 40m, 20m

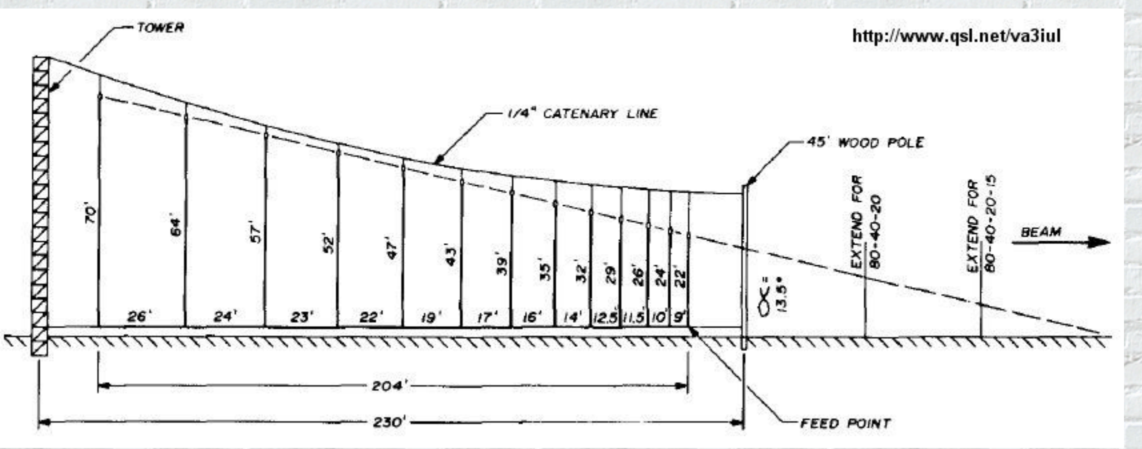


224 - Multiband Coaxial Dipole for 80m, 40m

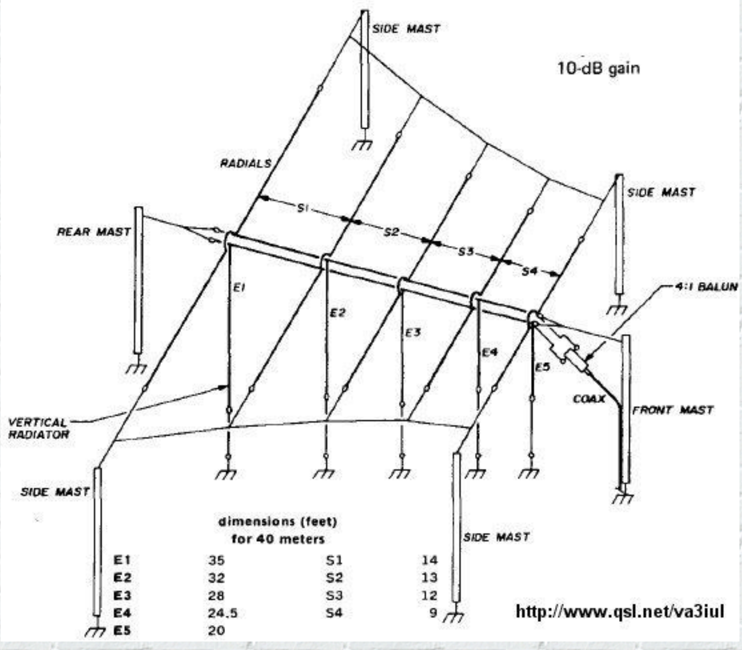


Trap coil L1 is 21½ turns of B&W coil stock, 2" diameter, 8 turns per inch.

225 - Vertical Log Periodic Antenna for 80m, 40m



226 - Inverted Vertical Log Periodic Antenna for 40m

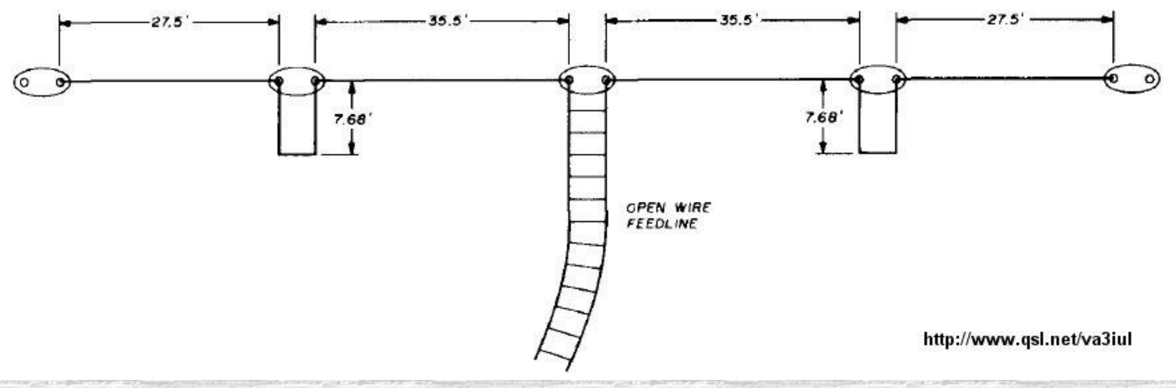


dimensions (feet)
for 40 meters

E1	35	S1	14
E2	32	S2	13
E3	28	S3	12
E4	24.5	S4	9
E5	20		

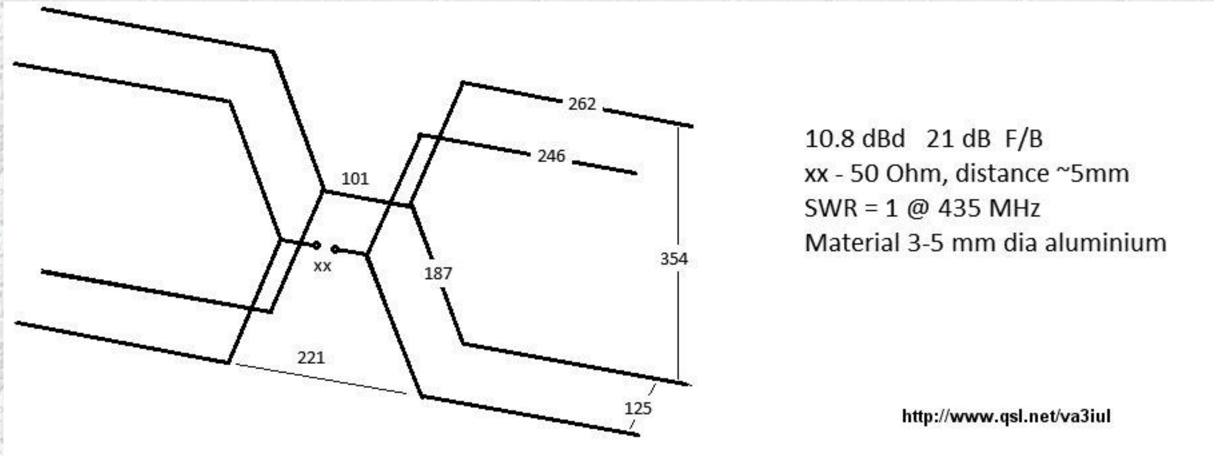
http://www.qsl.net/va3iul

227 - Double Extended Zepp Antenna Gain=7dB for 15m



http://www.qsl.net/va3iul

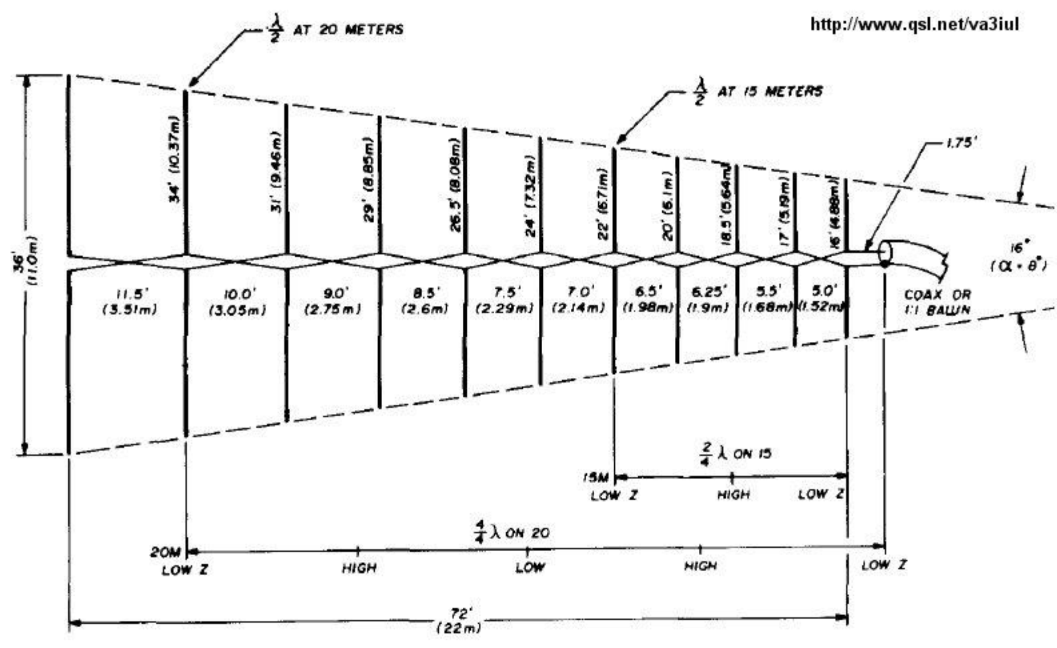
228 - Double Lazy-H Antenna G=10dB for 70cm



10.8 dBd 21 dB F/B
xx - 50 Ohm, distance ~5mm
SWR = 1 @ 435 MHz
Material 3-5 mm dia aluminium

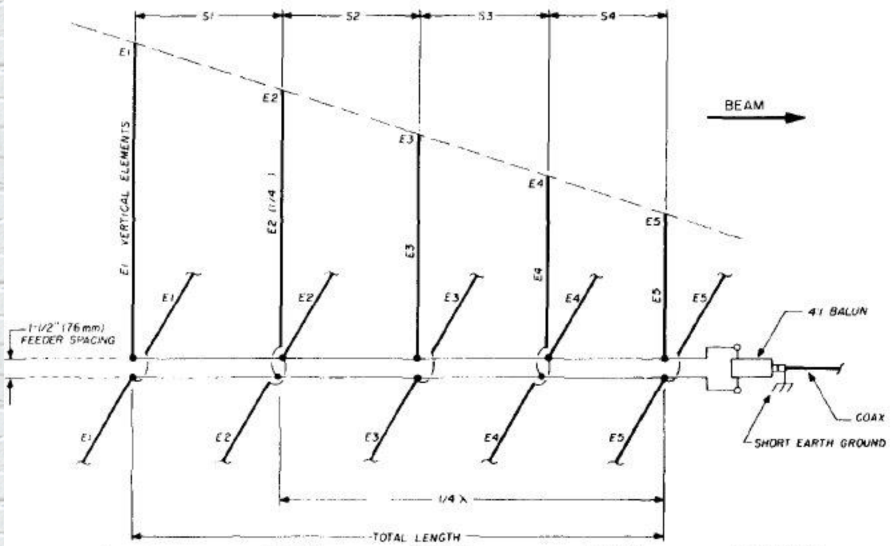
http://www.qsl.net/va3iul

229 - Wire Log Periodic Antenna G=12dB for 15m, 20m



http://www.qsl.net/va3iul

230 - Five-Elements Vertical Log Periodic for 80m, 40m, 20m



element	3.5-4.0[1]	3.8-4.0[2]	7.0-7.3[2]	14.0-14.35[1]
E1	70' (21.4 m)	65' (19.8 m)	35' (10.7 m)	17.5' (5.3 m)
E2	67' (20.4 m)	62' (18.9 m)	33' (10.0 m)	16.5' (5.0 m)
E3	58' (17.7 m)	55' (16.8 m)	28' (8.5 m)	14.0' (4.3 m)
E4	50' (15.3 m)	45' (13.7 m)	24.5' (7.5 m)	12.2' (3.7 m)
E5	43' (13.1 m)	40' (12.2 m)	20' (6.1 m)	10.0' (3.0 m)
S1	30' (9.2 m)	26' (7.9 m)	14' (4.3 m)	7.0' (2.1 m)
S2	27' (8.2 m)	24' (7.3 m)	13' (4.0 m)	6.5' (2.0 m)
S3	24' (7.3 m)	23' (7.0 m)	12' (3.7 m)	6.0' (1.8 m)
S4	19' (5.8 m)	18' (5.5 m)	9' (2.7 m)	4.5' (1.4 m)
total length	100' (30.5 m)	91' (27.8 m)	48' (14.6 m)	24' (7.3 m)
mast height	80' (24.4 m)	75' (22.9 m)	50' (15.3 m)	30' (9.2 m)
pole height	45' (13.7 m)	40' (12.2 m)	25' (7.6 m)	20' (6.1 m)

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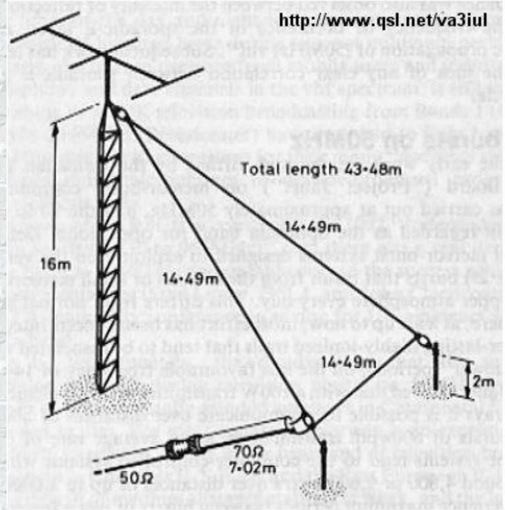
231 - Sloping Delta Loop Antenna for 40m



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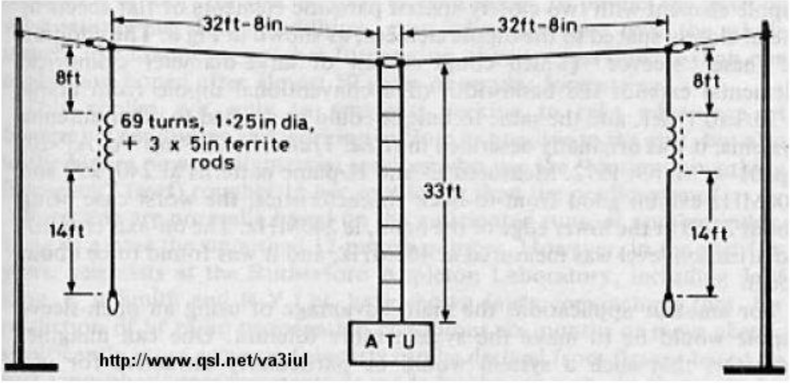
232 - Doublet Antenna for 160m



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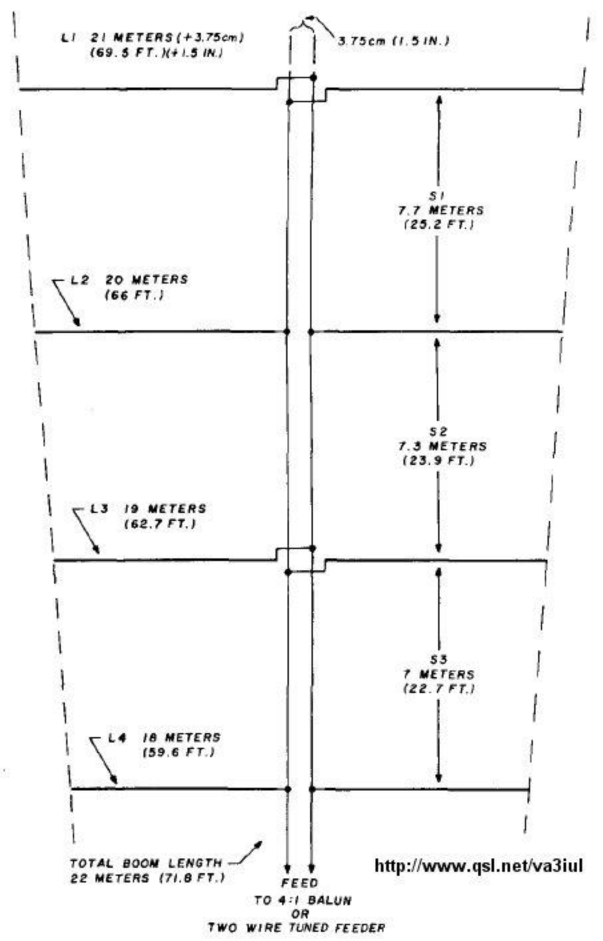
233 - Log Periodic Wire Beam for 40m



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234 - G3LDO Wire Beam Antenna for 20m, 15m, 10m

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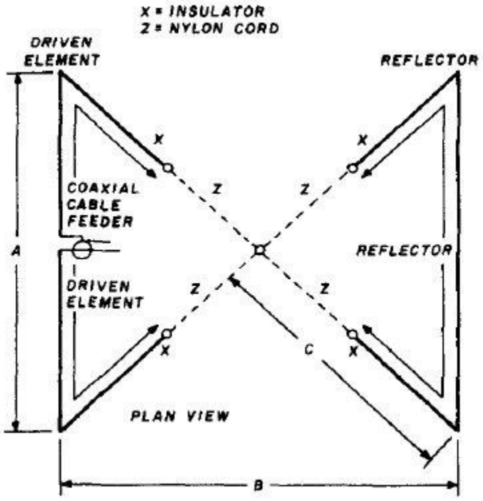
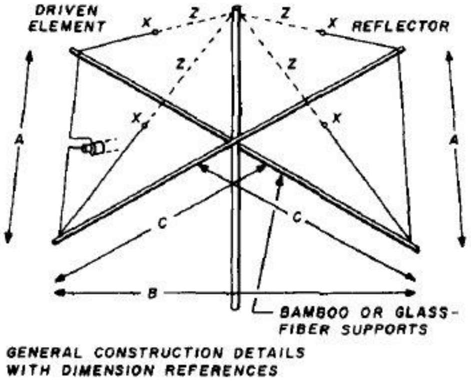
Data for the G3LDO wire-beam antenna. All dimensions are in inches and are for insulated wire; multiply by 1.04 for uninsulated wire. Dimension C is approximate.

band	reflector	driven element	A	B	C	D
20	452	417	245	263	180	33
15	302	279	154	166	113	22
10	225	208	114	122	85	15




DRIVEN ELEMENT
REFLECTOR
X
Z
A
B
C
BAMBOO OR GLASS-FIBER SUPPORTS
GENERAL CONSTRUCTION DETAILS WITH DIMENSION REFERENCES

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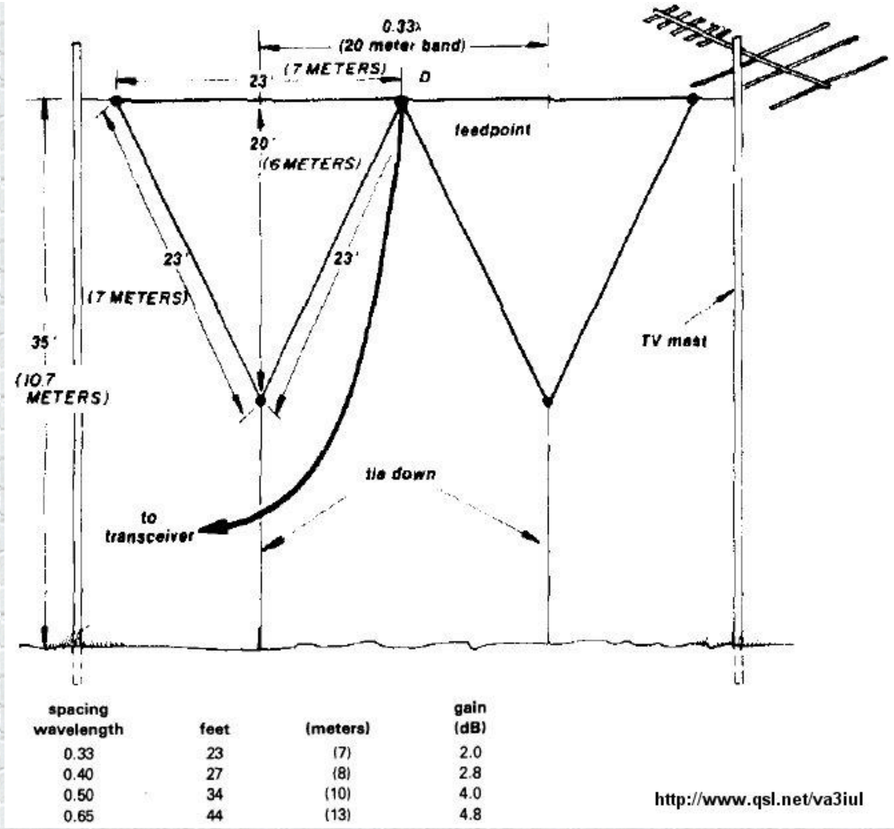
235 - Phased Delta Loop Array for 20m



spacing wavelength	feet	(meters)	gain (dB)
0.33	23	(7)	2.0
0.40	27	(8)	2.8
0.50	34	(10)	4.0
0.65	44	(13)	4.8

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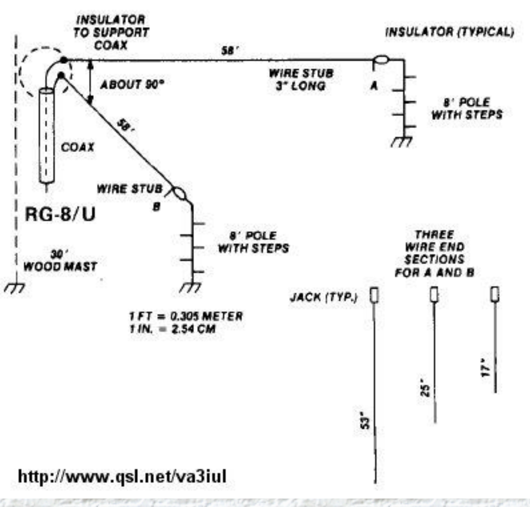
236 - Dual Band V-dipole for 80m, 40m



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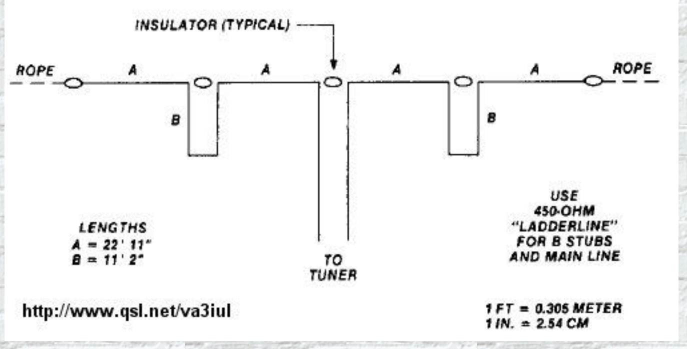
237 - Collinear Array 5dB-Gain for 15m



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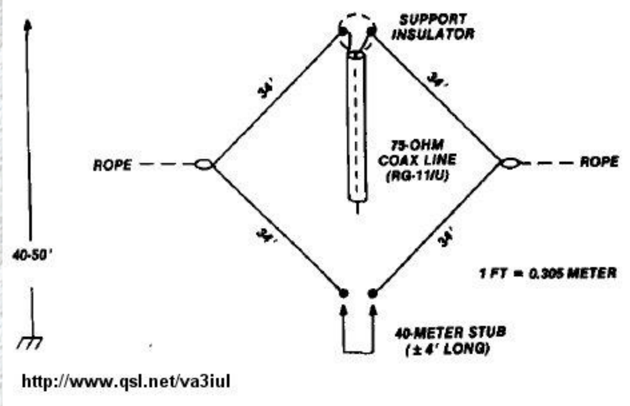
238 - Two-Band Quad Loop Antenna 80m, 40m



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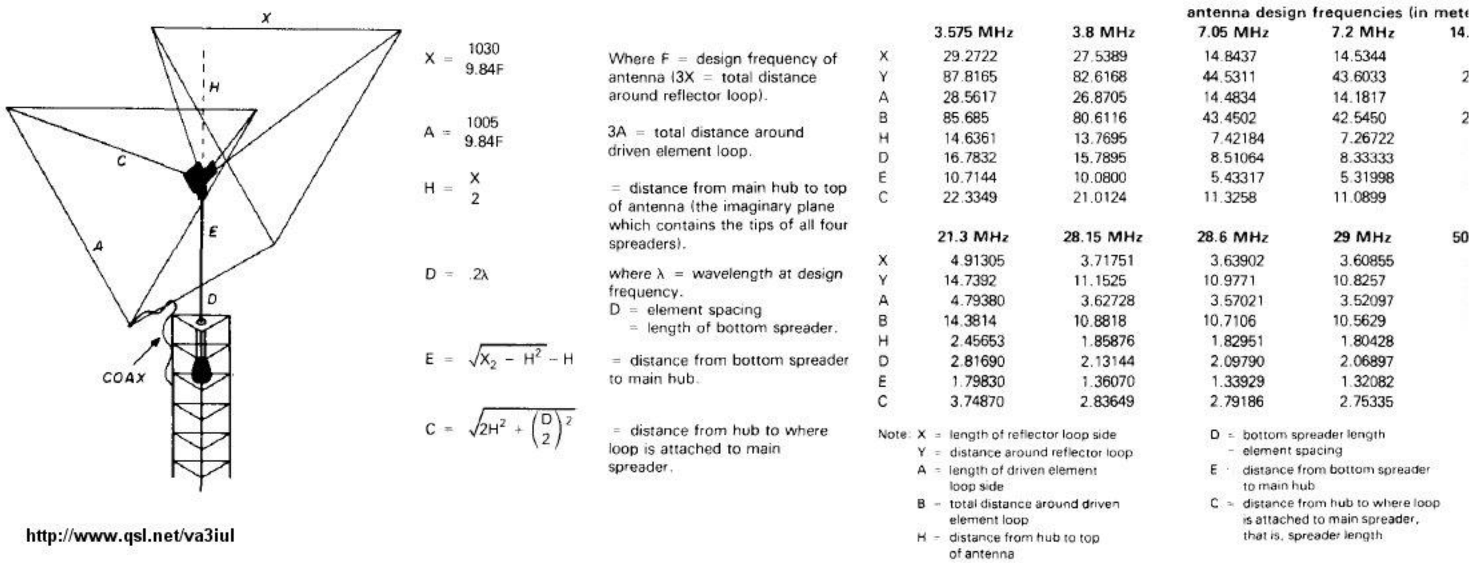
239 - K7CW Quad Antenna



$X = \frac{1030}{9.84F}$ Where F = design frequency of antenna (3X = total distance around reflector loop).

$A = \frac{1005}{9.84F}$ 3A = total distance around driven element loop.

$H = \frac{X}{2}$ = distance from main hub to top of antenna (the imaginary plane which contains the tips of all four spreaders).

$D = .2\lambda$ where λ = wavelength at design frequency.
D = element spacing
= length of bottom spreader.

$E = \sqrt{X_2 - H^2} - H$ = distance from bottom spreader to main hub.

$C = \sqrt{2H^2 + \left(\frac{D}{2}\right)^2}$ = distance from hub to where loop is attached to main spreader.

antenna design frequencies (in mete

	3.575 MHz	3.8 MHz	7.05 MHz	7.2 MHz	14.
X	29.2722	27.5389	14.8437	14.5344	
Y	87.8165	82.6168	44.5311	43.6033	2
A	28.5617	26.8705	14.4834	14.1817	
B	85.685	80.6116	43.4502	42.5450	2
H	14.6361	13.7695	7.42184	7.26722	
D	16.7832	15.7895	8.51064	8.33333	
E	10.7144	10.0800	5.43317	5.31998	
C	22.3349	21.0124	11.3258	11.0899	

	21.3 MHz	28.15 MHz	28.6 MHz	29 MHz	50
X	4.91305	3.71751	3.63902	3.60855	
Y	14.7392	11.1525	10.9771	10.8257	
A	4.79380	3.62728	3.57021	3.52097	
B	14.3814	10.8818	10.7106	10.5629	
H	2.45653	1.85876	1.82951	1.80428	
D	2.81690	2.13144	2.09790	2.06897	
E	1.79830	1.36070	1.33929	1.32082	
C	3.74870	2.83649	2.79186	2.75335	

Note: X = length of reflector loop side
Y = distance around reflector loop
A = length of driven element loop side
B = total distance around driven element loop
H = distance from hub to top of antenna
D = bottom spreader length
= element spacing
E = distance from bottom spreader to main hub
C = distance from hub to where loop is attached to main spreader, that is, spreader length

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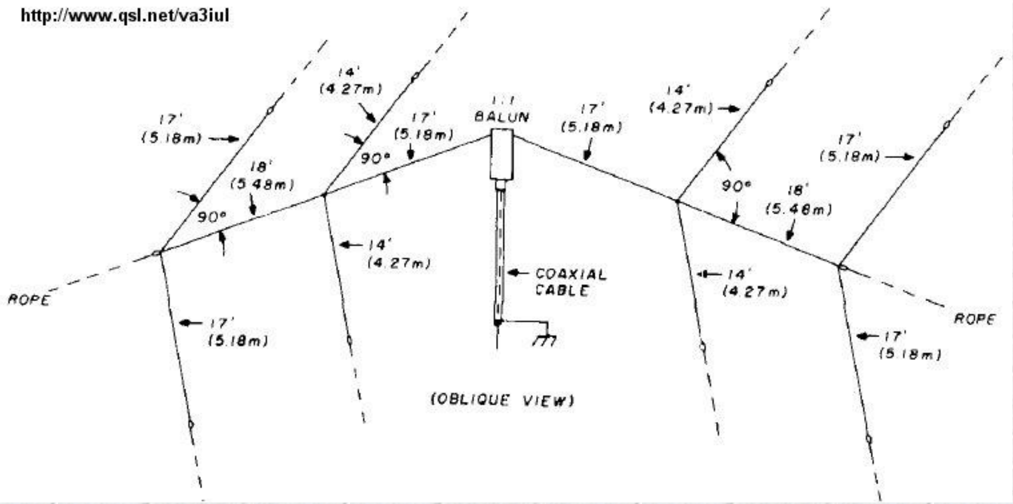
240 - Broadband Short Dipole for 80m

http://www.qsl.net/va3iul



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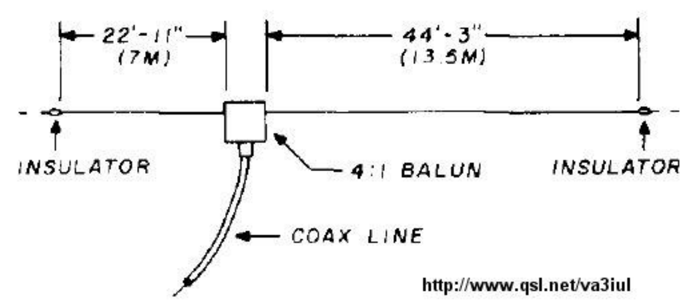
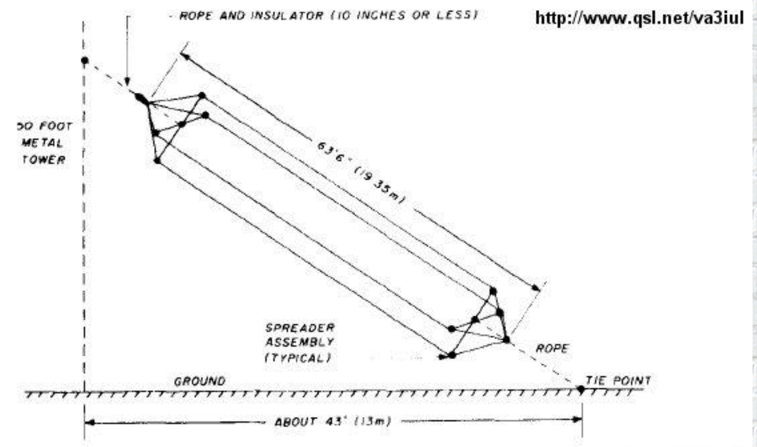
241 - Off-Center Fed Dipole for 40m, 20m, 10m



http://www.qsl.net/va3iul

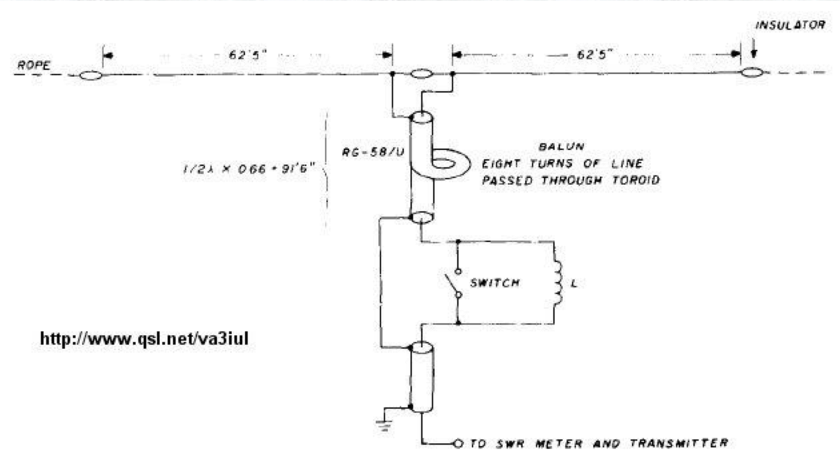
242 - Broadband Sloper Antenna for 80m



http://www.qsl.net/va3iul

80-meter WD4FAB broadband sloper. Spreader assemblies are made of 36-inch long fiberglass tubes. The four antenna wires are tied together about 24 inches past each spreader assembly. A nylon line may be required from the crossover point of the spreader to the outer insulator to prevent bowing. The SWR plot of the antenna falls below 1.4-to-1 at 3.5 MHz; 1.25-to-1 at 3.8 MHz and 1.4-to-1 at 4.0 MHz. Feedpoint resistance of the antenna may be changed by altering the slope angle. The resonant frequency is adjusted by changing length — no climbing necessary!

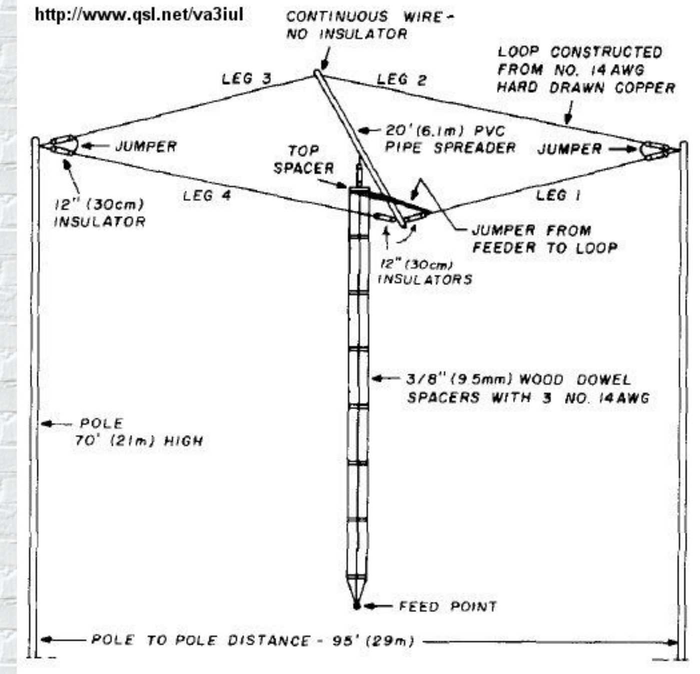
243 - Two-Frequency Dipole Antenna for 80m


INSULATOR
ROPE
62'5"
62'5"
1/2λ × 0.66 = 91'6"
RG-58/U
BALUN
EIGHT TURNS OF LINE PASSED THROUGH TOROID
SWITCH
L
TO SWR METER AND TRANSMITTER

http://www.qsl.net/va3iul

The W6TC two-frequency dipole for 80 meters. Antenna is cut for resonance at high frequency end of band. A single loading coil for operation at the low frequency end of the band is placed an electrical half-wavelength down the transmission line. The line is decoupled from the antenna by a simple balun placed directly at the antenna insulator. Toroid is powdered iron material T-200 (2" OD) (1.25" ID), 2-mix (red, μ = 10 (Amidon T-200-2), or equivalent.

244 - Top Loaded Vertical Antenna for 160m


http://www.qsl.net/va3iul
CONTINUOUS WIRE - NO INSULATOR
LOOP CONSTRUCTED FROM NO. 14 AWG HARD DRAWN COPPER
LEG 3
LEG 2
20' (6.1m) PVC PIPE SPREADER
JUMPER
JUMPER
TOP SPACER
12" (30cm) INSULATOR
LEG 4
LEG 1
JUMPER FROM FEEDER TO LOOP
12" (30cm) INSULATORS
3/8" (9.5mm) WOOD DOWEL SPACERS WITH 3 NO. 14AWG
POLE 70' (21m) HIGH
FEED POINT
POLE TO POLE DISTANCE - 95' (29m)

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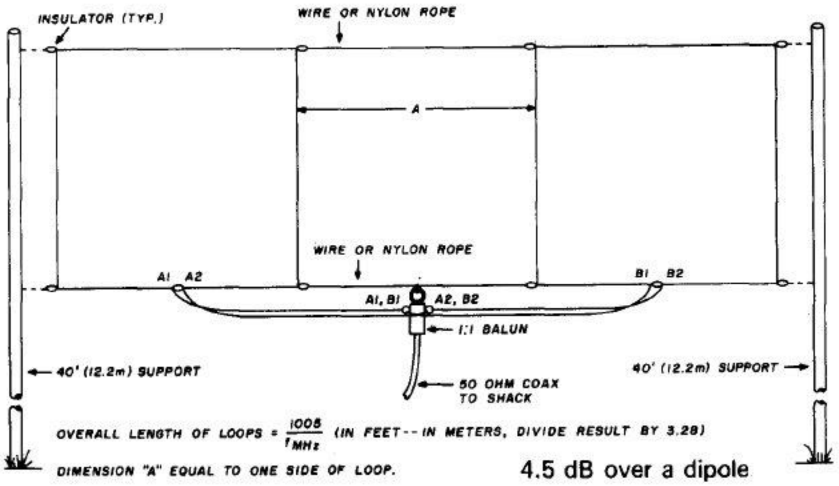
245 - Two Loop Beam Antenna for 20m, 15m



OVERALL LENGTH OF LOOPS = $\frac{1005}{f_{MHz}}$ (IN FEET--IN METERS, DIVIDE RESULT BY 3.28)

DIMENSION "A" EQUAL TO ONE SIDE OF LOOP.

4.5 dB over a dipole

The W2TBZ loop beam. The phasing lines are made of 300-ohm TV line. Length of phasing line = $\frac{468}{f_{MHz}}$ × velocity factor of 300-ohm line. Balun is supported at center of lower nylon rope.

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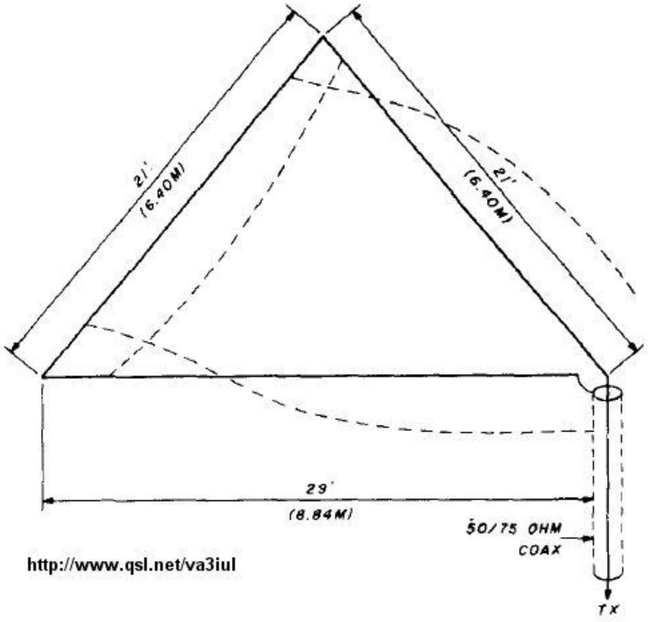
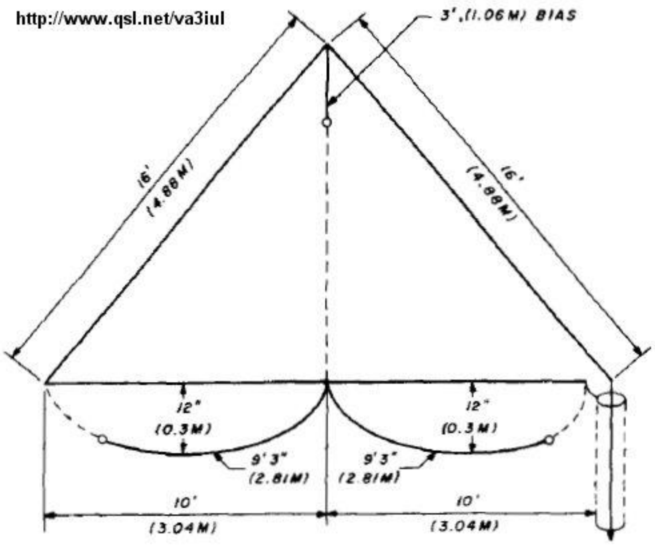
246 - Corner-Fed Delta Loop Antenna for 80m, 40m, 20m



DIMENSIONS FOR FULL-SIZE CORNER-FED DELTA LOOPS

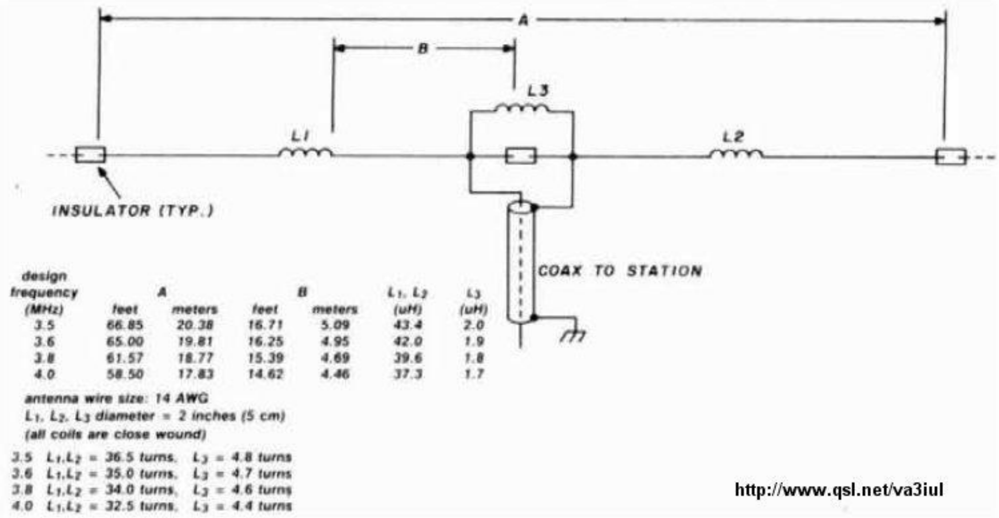
frequency (MHz)	total loop circumference		length of each side		length of base	
	(feet)	(meters)	(feet)	(meters)	(feet)	(meters)
3.600	279 ft. 2 in.	(85.09)	82 ft.	(24.99)	115 ft. 2 in.	(35.10)
7.075	142 ft. 0 in.	(43.28)	42 ft.	(12.80)	58 ft. 0 in.	(17.68)
14.150	71 ft. 0 in.	(21.64)	21 ft.	(6.40)	29 ft. 0 in.	(8.84)

247 - Loaded Delta Loop Antenna for 40m, 20m



The final loaded loop for 14 MHz. All dimensions are doubled for operation on 7 MHz. Base loading wires are each 18 feet 4 inches (5.59 meters). The top loading wire is made taut by securing to base with thin light nylon cord.

248 - Compact Size Dipole for 80m



design frequency (MHz)	A feet	A meters	B feet	B meters	L_1, L_2 (uH)	L_3 (uH)
3.5	66.85	20.38	16.71	5.09	43.4	2.0
3.6	65.00	19.81	16.25	4.95	42.0	1.9
3.8	61.57	18.77	15.39	4.69	39.6	1.8
4.0	58.50	17.83	14.62	4.46	37.3	1.7

antenna wire size: 14 AWG
L_1, L_2, L_3 diameter = 2 inches (5 cm)
(all coils are close wound)

3.5 L_1,L_2 = 36.5 turns, L_3 = 4.8 turns
3.6 L_1,L_2 = 35.0 turns, L_3 = 4.7 turns
3.8 L_1,L_2 = 34.0 turns, L_3 = 4.6 turns
4.0 L_1,L_2 = 32.5 turns, L_3 = 4.4 turns

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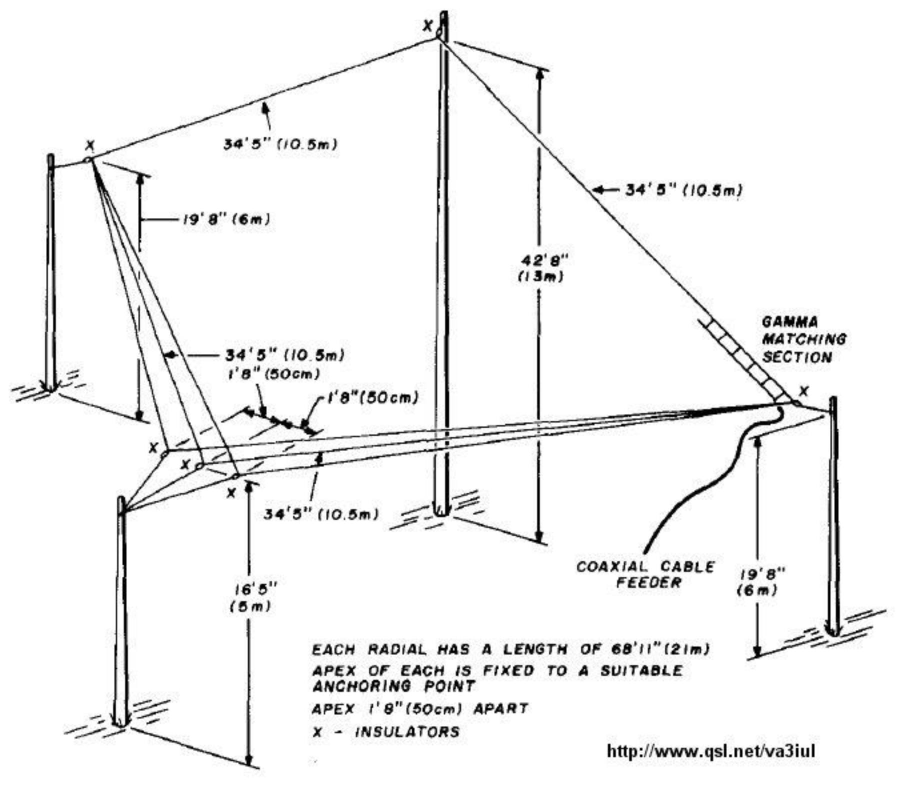
249 - JAWS 3dB Gain Antenna for 40m



EACH RADIAL HAS A LENGTH OF 68'11" (21m)
APEX OF EACH IS FIXED TO A SUITABLE ANCHORING POINT
APEX 1'8" (50cm) APART
X - INSULATORS

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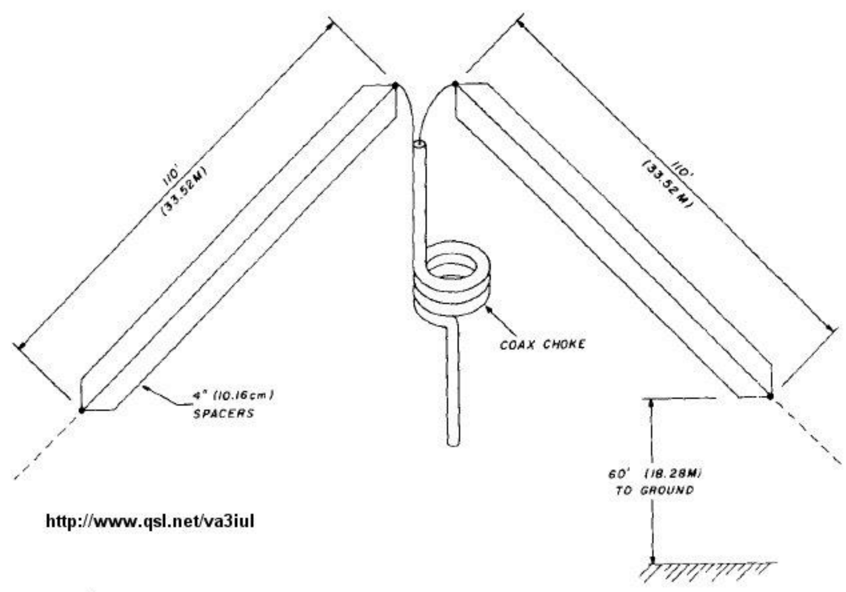
250 - Inverted-V Antenna for 160m



The inverted-V antenna for 160 meters at VE7BS. Wires all lie in the same plane. Apex is at 105 feet (32 meters).

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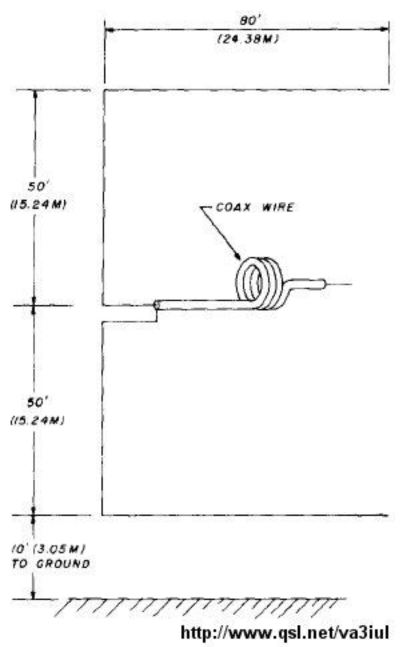
251 - Lazy-U Antenna for 160m



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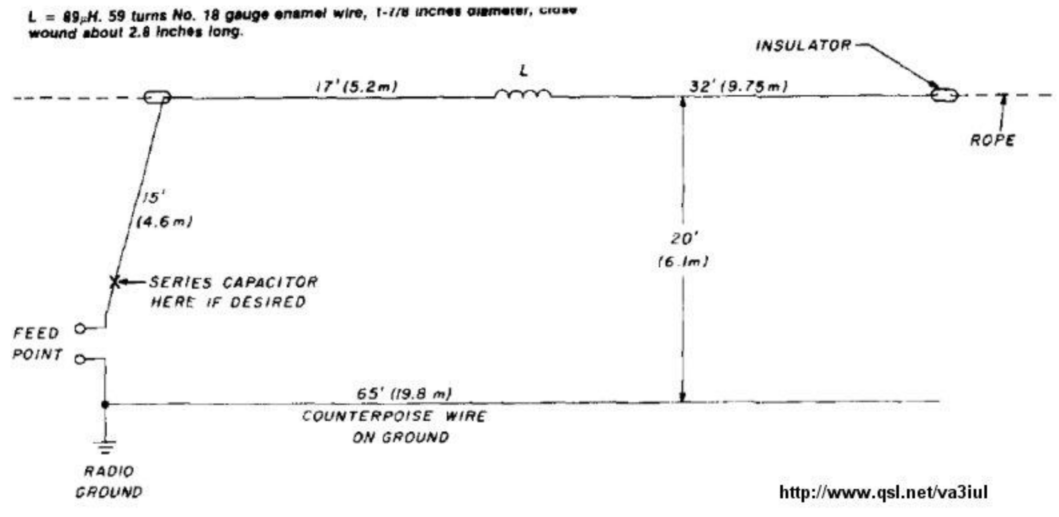
252 - AF3V Compact Antenna for 160m



L = 89μH. 59 turns No. 18 gauge enamel wire, 1-7/8 inches diameter, close wound about 2.8 inches long.

INSULATOR
17' (5.2m)
L
32' (9.75m)
ROPE
15' (4.6m)
20' (6.1m)
SERIES CAPACITOR HERE IF DESIRED
FEED POINT
65' (19.8 m) COUNTERPOISE WIRE ON GROUND
RADIO GROUND
http://www.qsl.net/va3iul

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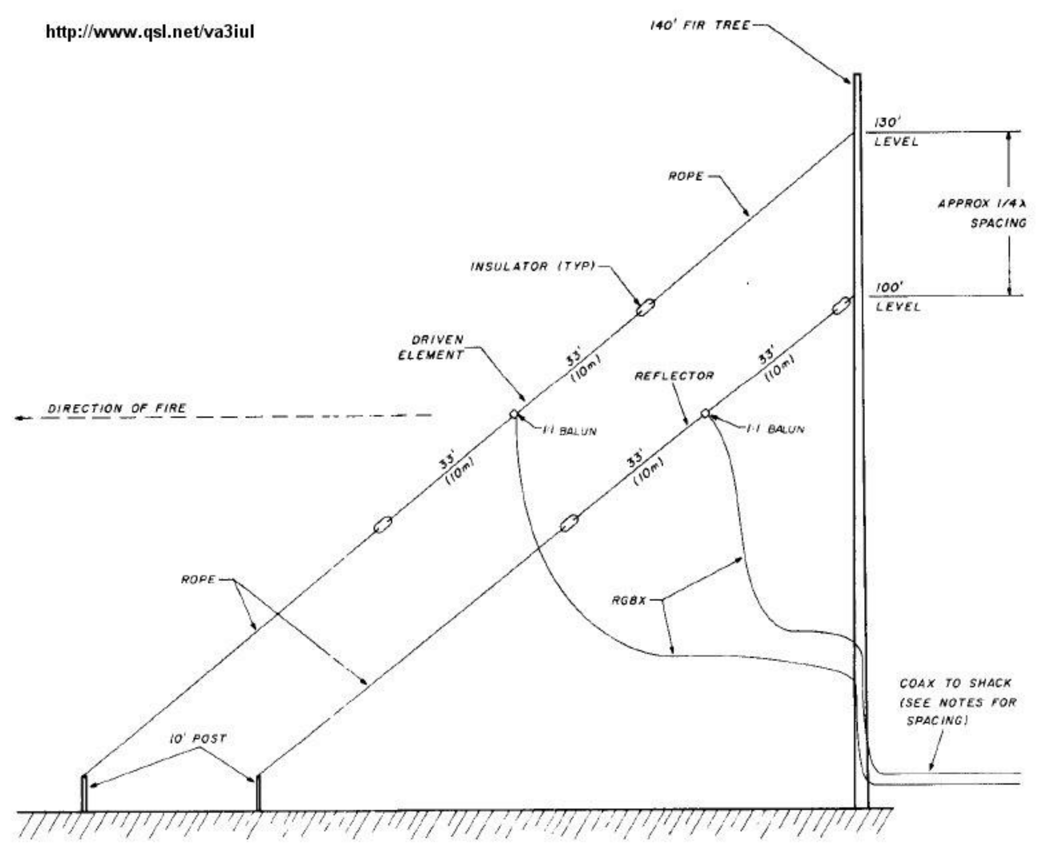
253 - Hot Beam Wire Antenna for 40m



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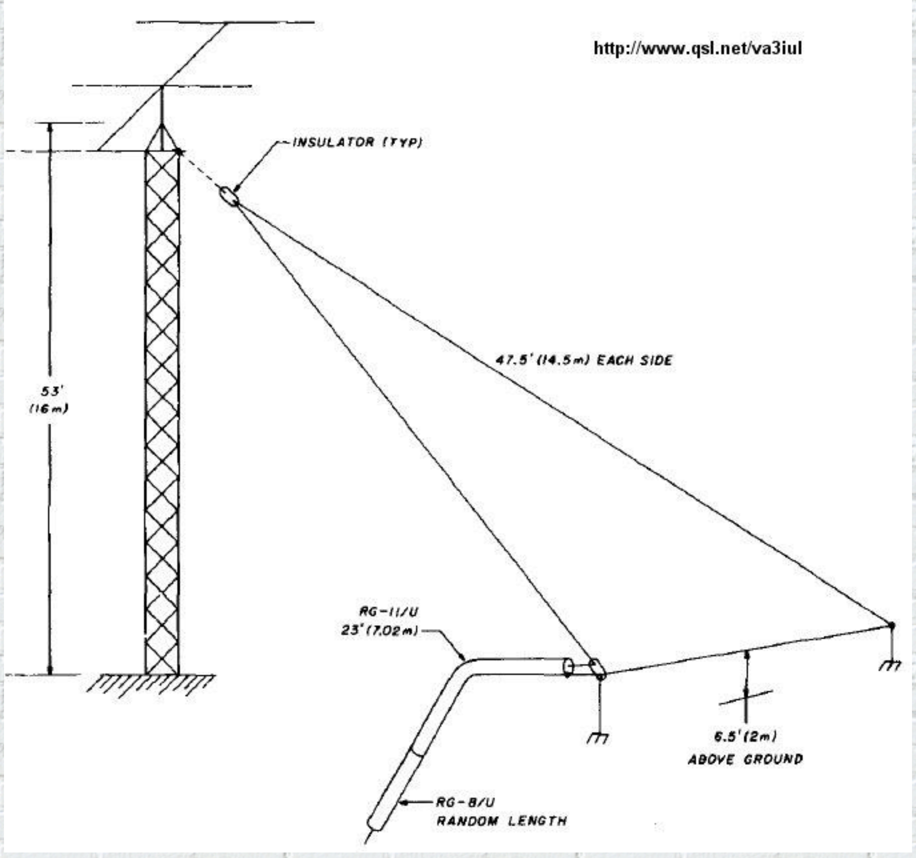
254 - Sloping Delta Loop for 40m



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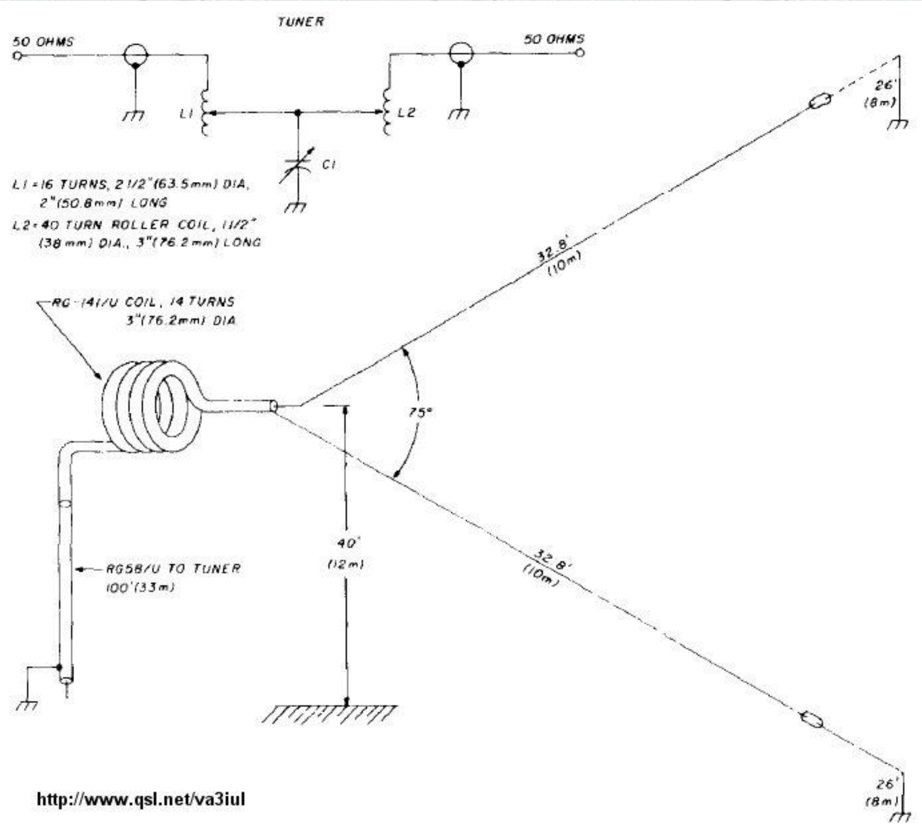
255 - K6FD Multiband Antenna with T-tuner


TUNER
50 OHMS
50 OHMS
L1
L2
C1
L1 = 16 TURNS, 2 1/2" (63.5 mm) DIA, 2" (50.8 mm) LONG
L2 = 40 TURN ROLLER COIL, 1 1/2" (38 mm) DIA., 3" (76.2 mm) LONG
RG-141/U COIL, 14 TURNS 3" (76.2 mm) DIA
RG58/U TO TUNER 100' (33 m)
40'
(12 m)
75°
32.8'
(10m)
32.8'
(10m)
26'
(8 m)
26'
(8 m)
http://www.qsl.net/va3iul

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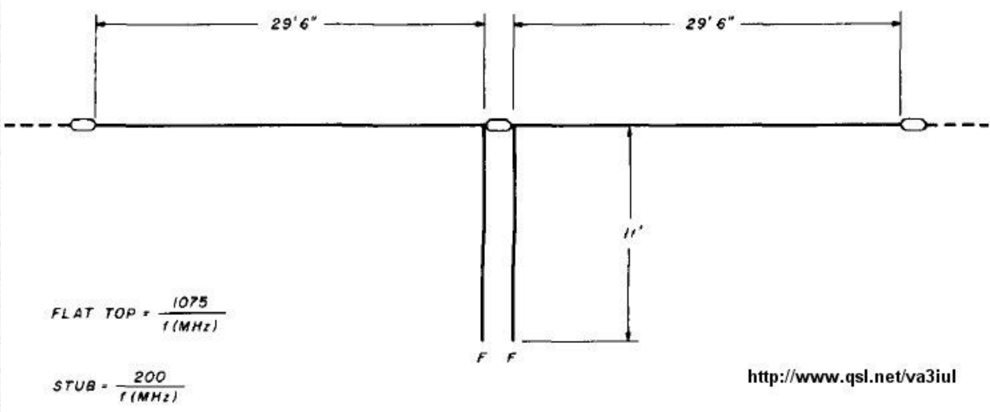
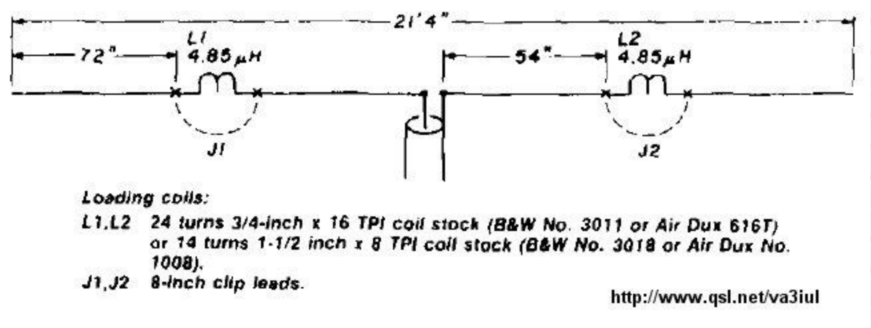
256 - Dual Band Dipole Antenna for 17m, 10m



257 - Compact Travel Dipole Antenna for 10m, 15m, 20m

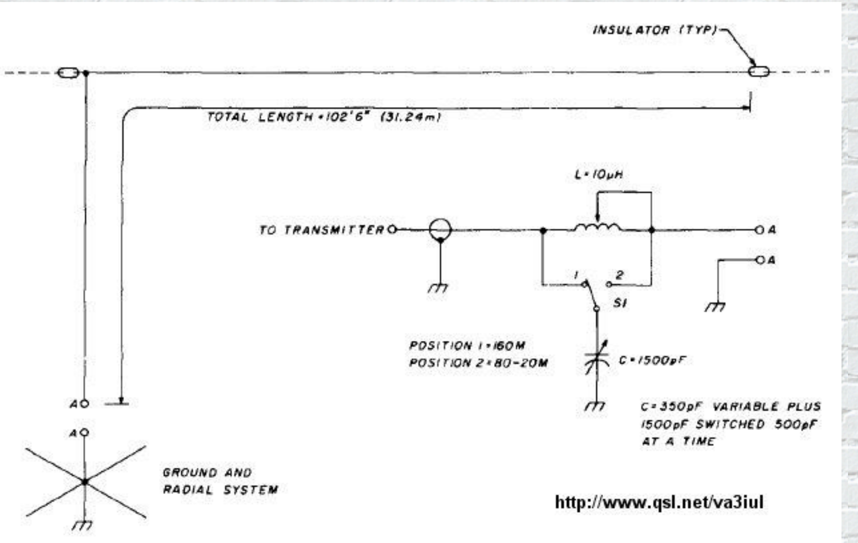


Loading coils:

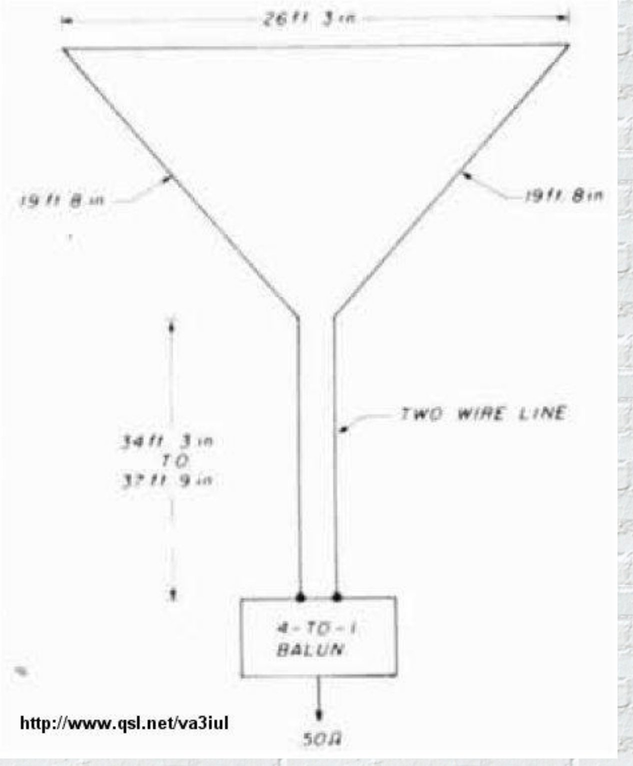
L1,L2 24 turns 3/4-inch x 16 TPI coil stock (B&W No. 3011 or Air Dux 616T) or 14 turns 1-1/2 inch x 8 TPI coil stock (B&W No. 3018 or Air Dux No. 1008).

J1,J2 8-inch clip leads.

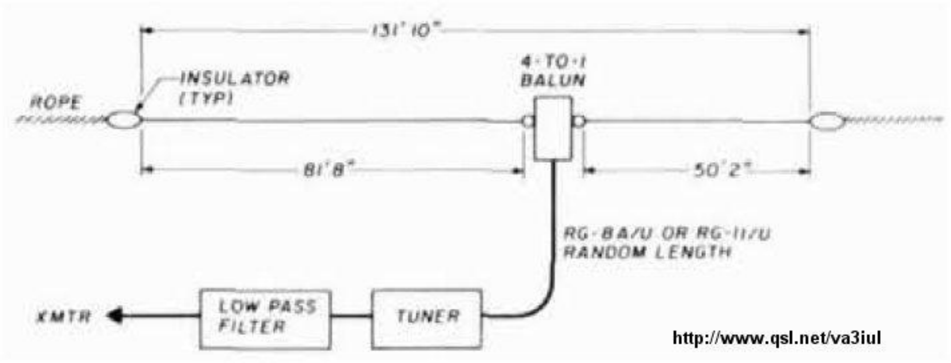
258 - End-Fire Antenna for 160m, 80m, 40m, 20m



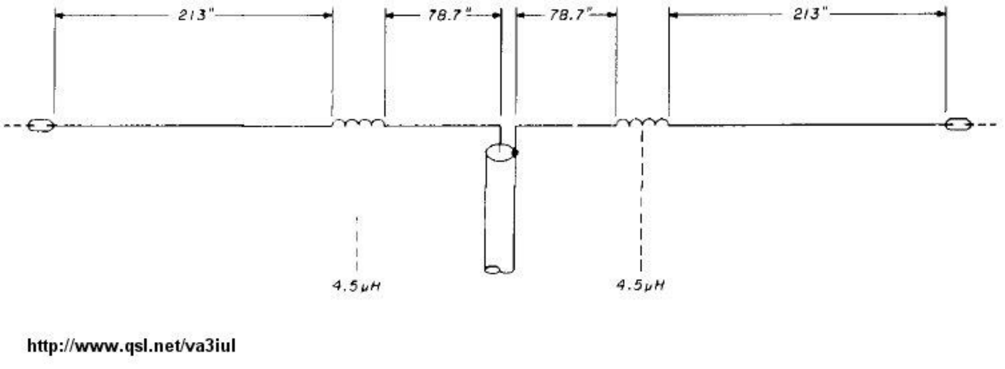
259 - Four Band Loop for 40m, 20m, 15m, 10m

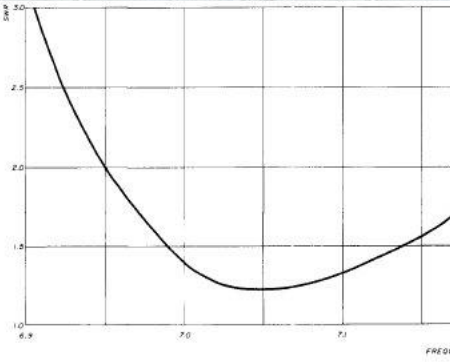


260 - Carolina Windom Antenna for 80 to 10m

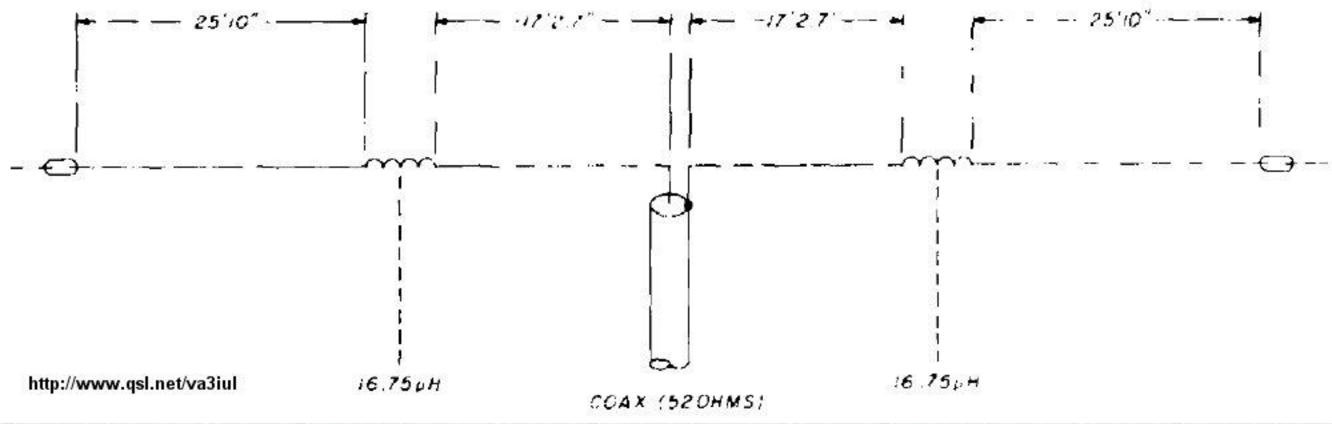


261 - Shortened Loaded Dipole for 40m

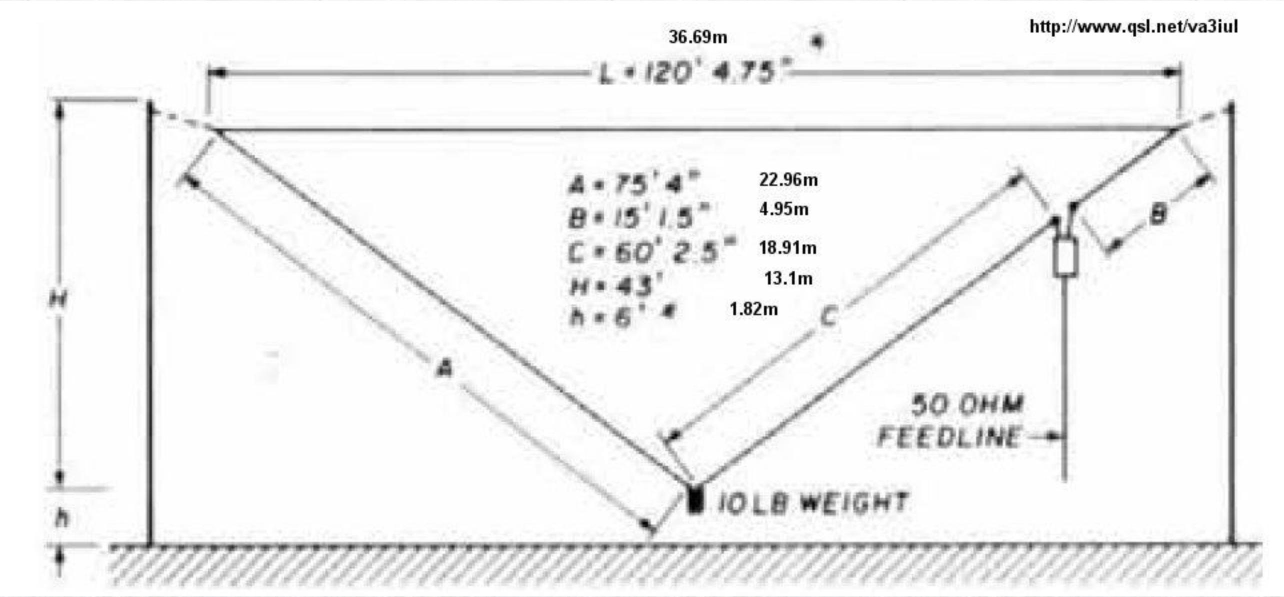




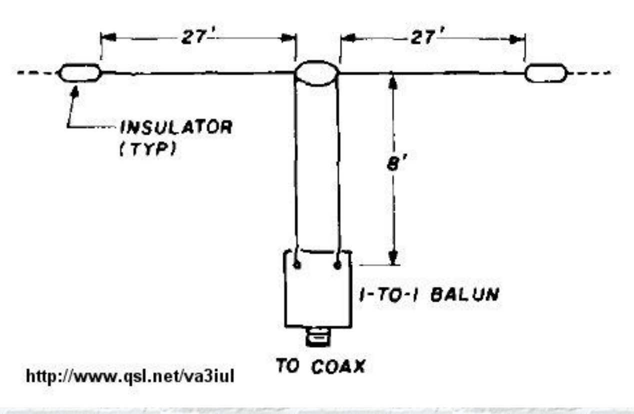
262 - Shortened Loaded Dipole for 80m



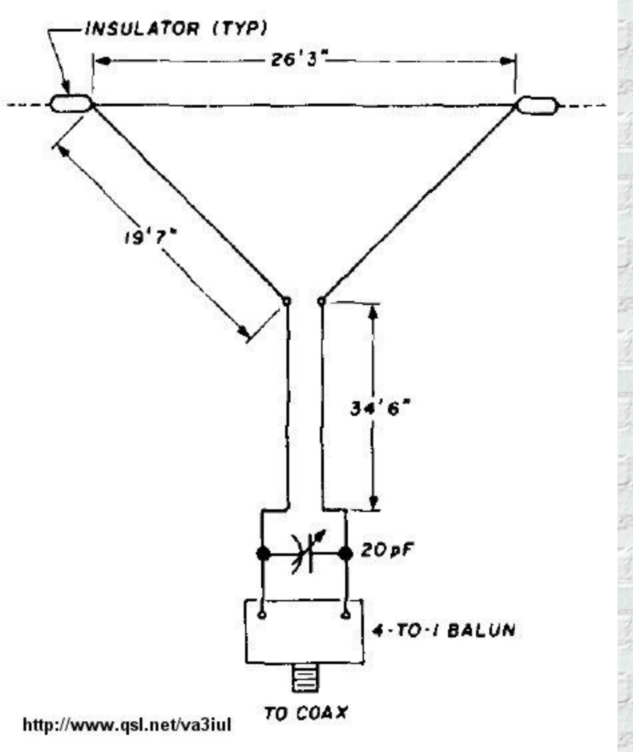
263 - Low Radiation Angle Inverted Delta Loop for 80m



264 - Compact Dipole Antenna for 40m, 15m



265 - Vertical Delta Loop for 40m to 10m



http://www.qsl.net/va3iul

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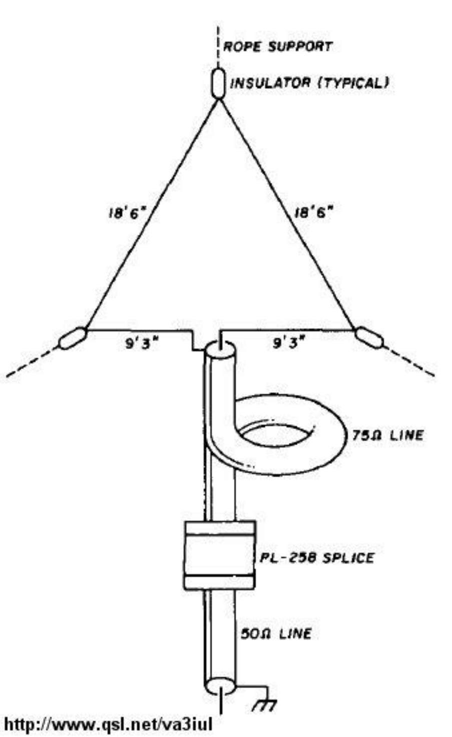
266 - Delta Loop Antenna for 17m



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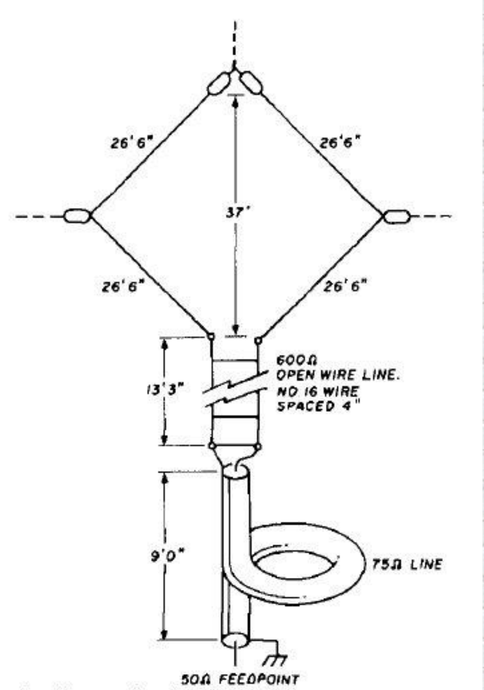
267 - Bi-Square Beam Gain=3dBd for 17m



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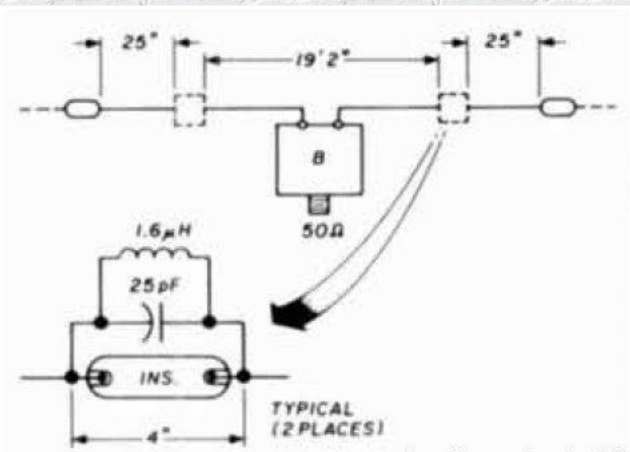
268 -Trap Dipole Antenna for 17m,13m



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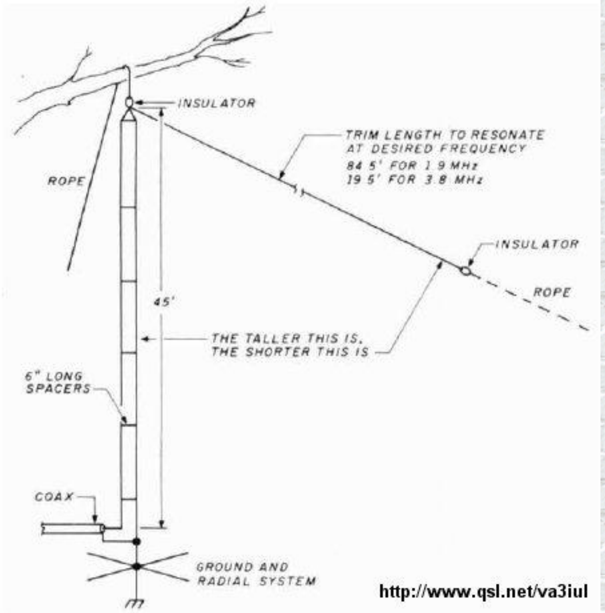
269 - Hanging Unipole Antenna for 160m, 80m



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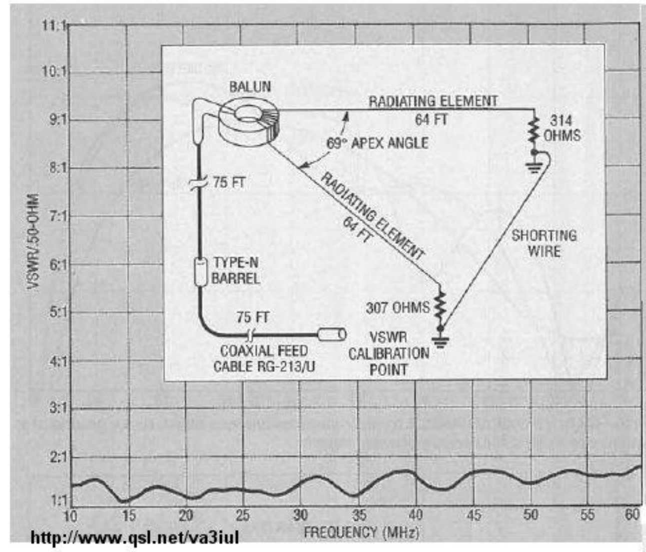
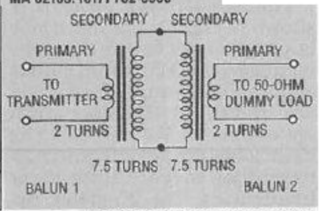
270 - Wideband Sloping Vee Antenna - 30m to 6m



SOURCES OF MATERIALS

The following companies are sources for materials and computer software for this project:

- Toroidal ferrite cores (Part No. FT240-43)—Radio Kit, Inc., P.O. Box 973, Pelham, NH 03076, (603) 635-2235
- Film power resistors—Power Film Systems, Inc., Yellville, AR 72687, (501) 449-4091
- Antenna design software—Phadean Engineering Co., Inc., P.O. Box 611, Shrewsbury, MA 01545, (508) 869-6077
- Phosphor-bronze wire—Astro Industries, Inc., Dayton, OH 43432, (800) 543-5810
- Fiberglass tubing—J. T. Ryerson Co., P. O. Box 1111, Boston, MA 02103. (617) 782-6900



-BACK-TO-BACK INSERTION LOSS TEST of baluns for sloping-vee antenna.

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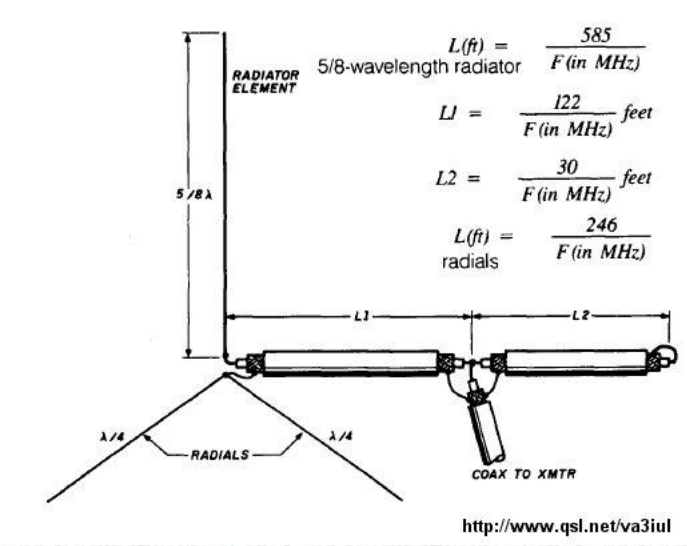
271 - 5/8 Wavelength Antenna



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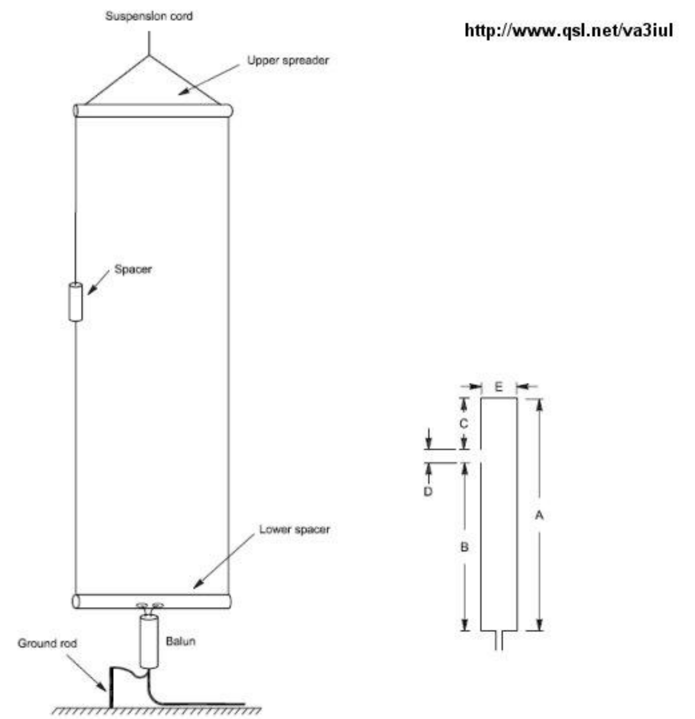
272 - C-Pole Vertical Antenna



Band (meters)	A (inches)	B (inches)	C (inches)	D (inches)	E (inches)	2:1 SWR bandwidth (kHz)
160	1666	924	994	60	80	58
80	840	460	360	30	40	120
60	591	322	249	20	26	250
40	450	240	190	20	20	260
30	320	167	139	14	14	360
20	177	85	84	8	40	400
15	124	60	60	4	20	600
10	87	46	37	4	20	800

Wire diameter is 1/16-inch. Height of the lower horizontal wire is 12 inches to 24 inches and is non-critical.

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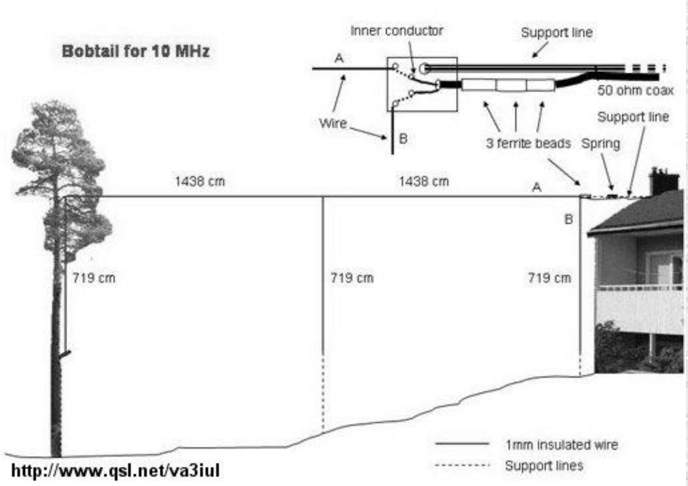
273 - Bobtail Antenna for 30m



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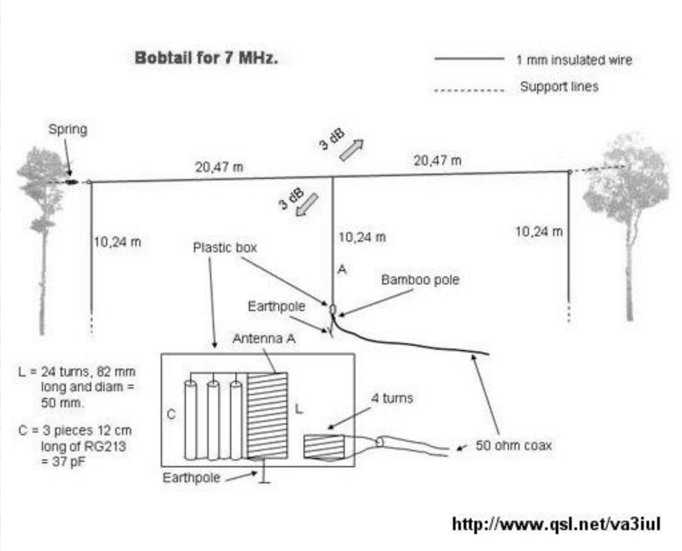
274 - Bobtail Antenna for 40m



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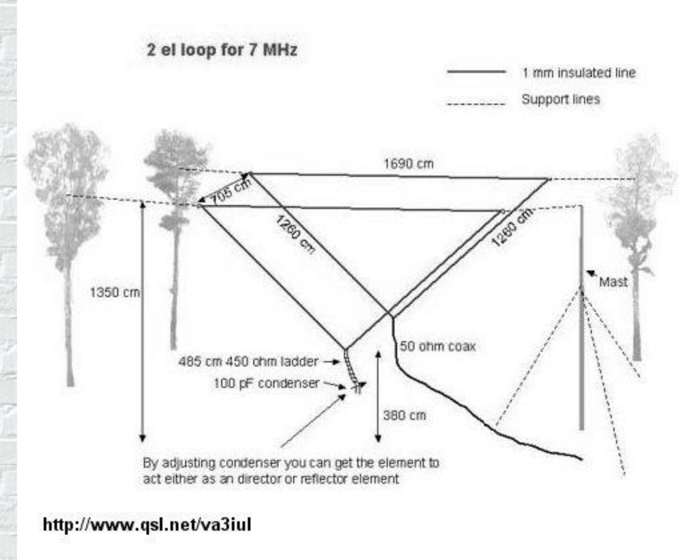
275 - Two Elements Vertical Loop Antenna for 40m



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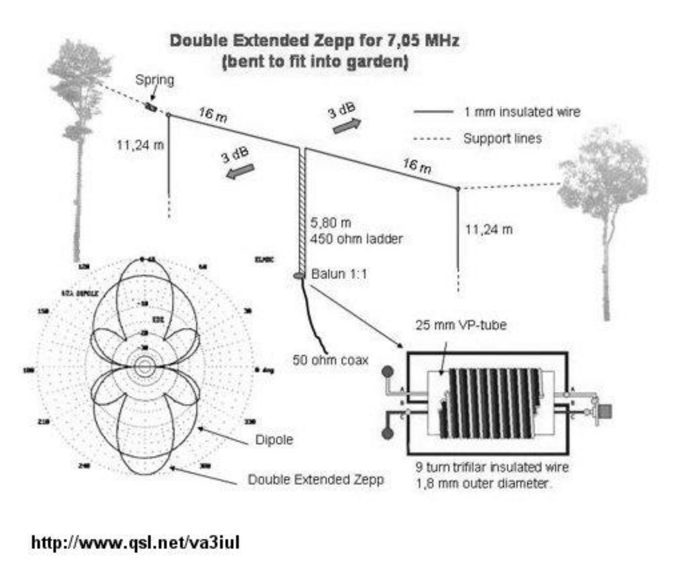
276 - Double Extended Zepp Antenna for 40m



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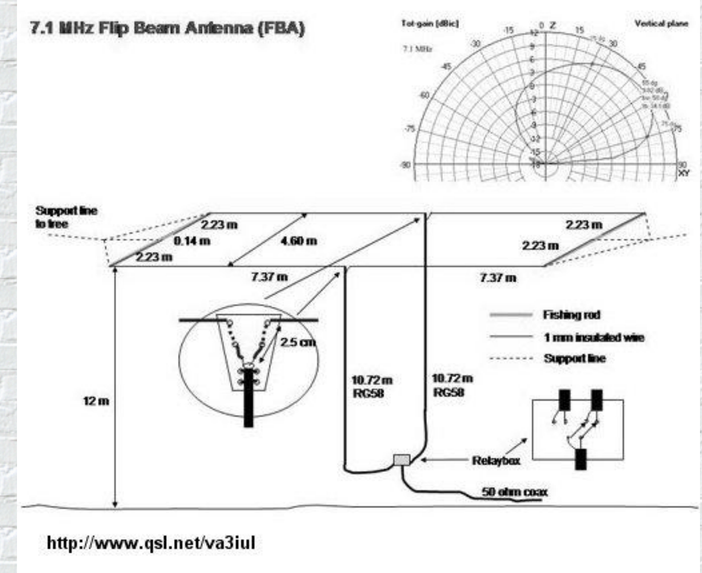
277 - Reversible Moxon Flip Beam for 40m



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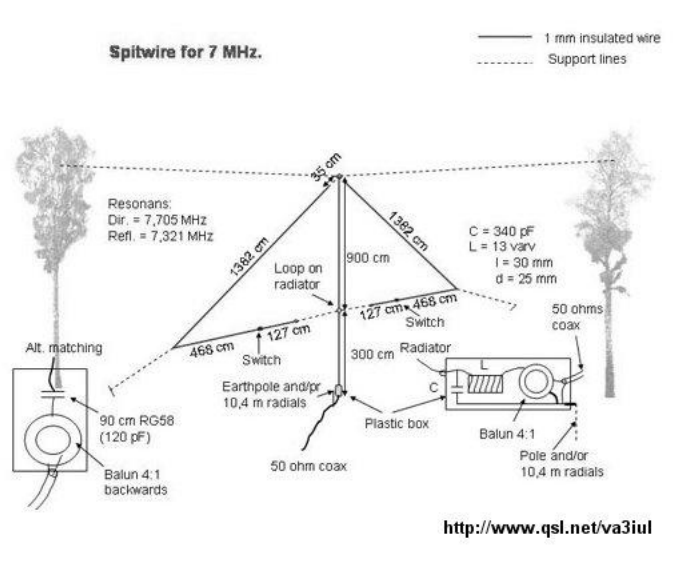
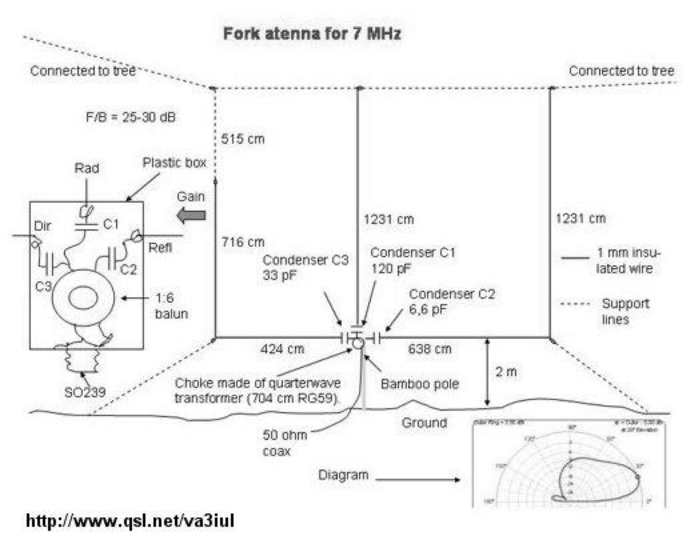
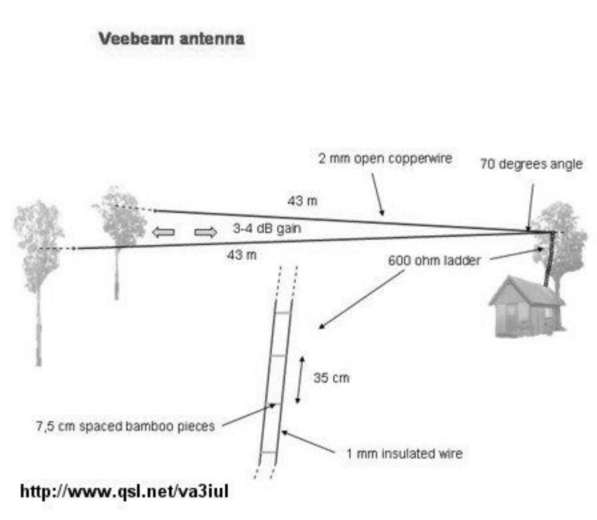
278 - Spitwire Antenna for 40m



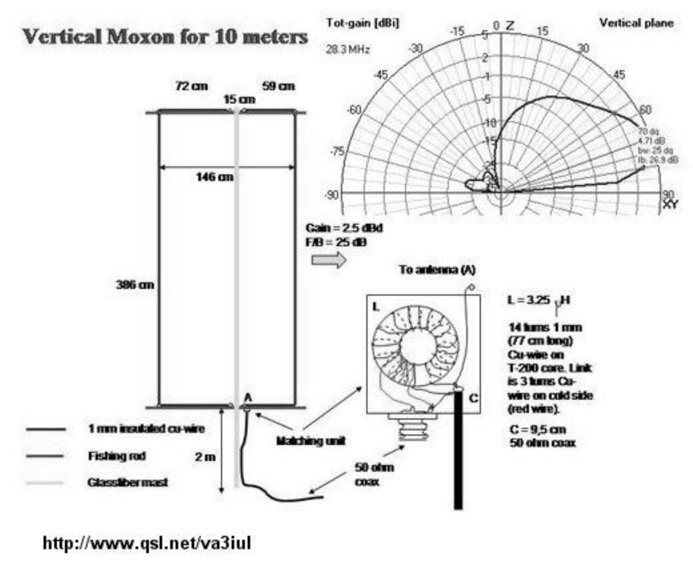
279 - Fork Antenna for 40m



280 - Veebeam Antenna 3dB-Gain for All Bands



281 - Vertical Moxon Antenna for 10m



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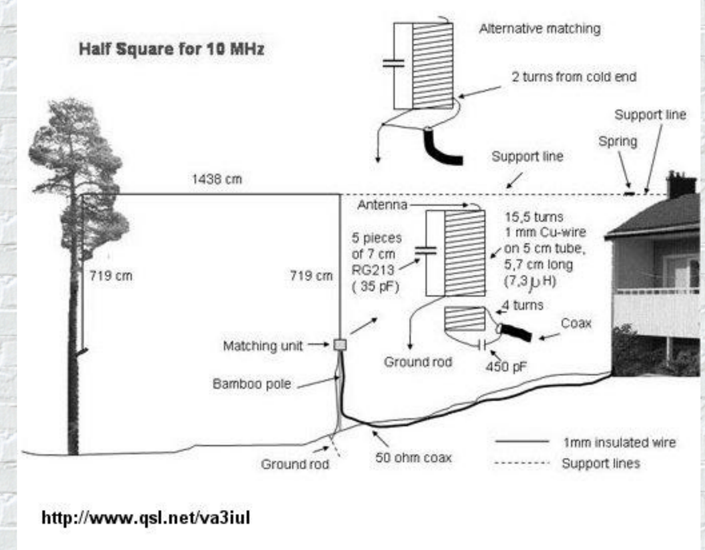
282 - Half-Square Antenna for 30m



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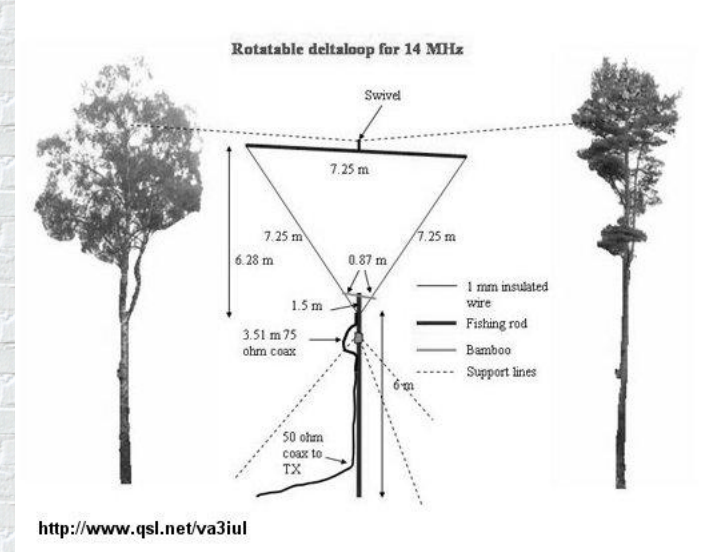
283 - Rotatable Vertical Delta Loop for 20m



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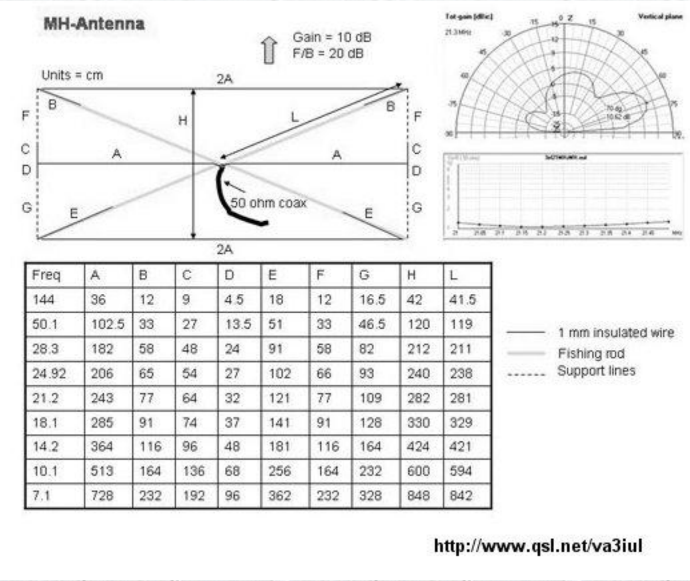
284 - Mini-Horse Antenna 10dB-Gain for 40m-to-2m



Freq	A	B	C	D	E	F	G	H	L
144	36	12	9	4.5	18	12	16.5	42	41.5
50.1	102.5	33	27	13.5	51	33	46.5	120	119
28.3	182	58	48	24	91	58	82	212	211
24.92	206	65	54	27	102	66	93	240	238
21.2	243	77	64	32	121	77	109	282	281
18.1	285	91	74	37	141	91	128	330	329
14.2	364	116	96	48	181	116	164	424	421
10.1	513	164	136	68	256	164	232	600	594
7.1	728	232	192	96	362	232	328	848	842

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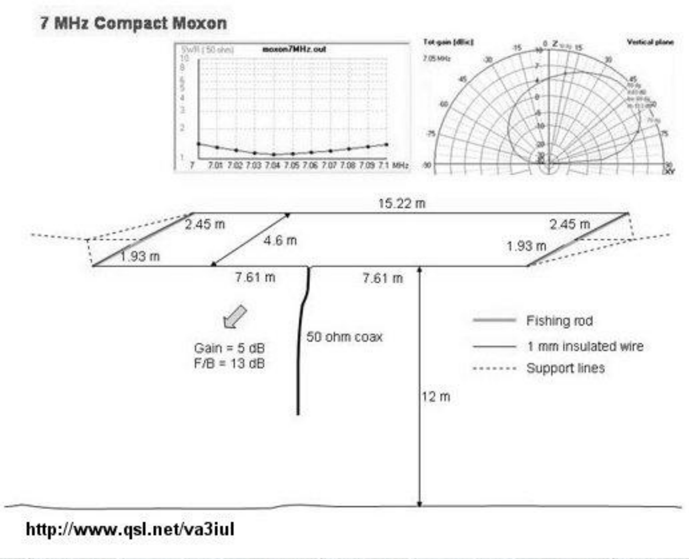
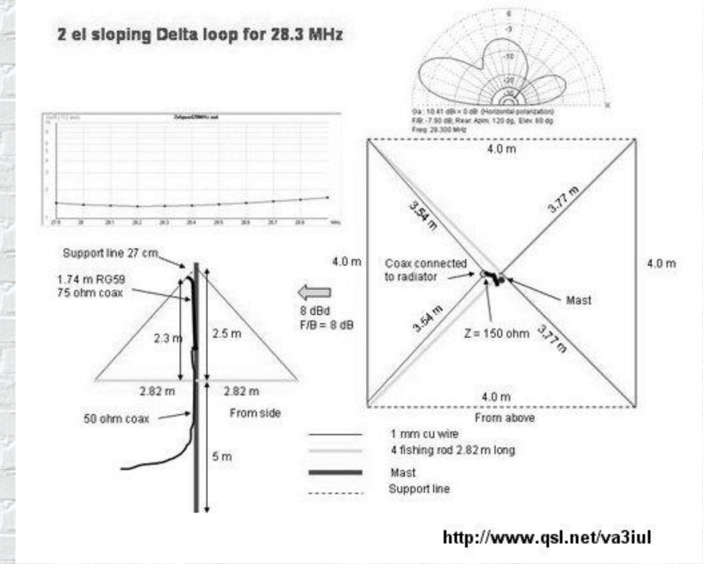
285 - Compact Moxon Antenna 5dB-Gain for 40m



286 - Two Elements Sloping Delta Loop 8dB-Gain for 10m



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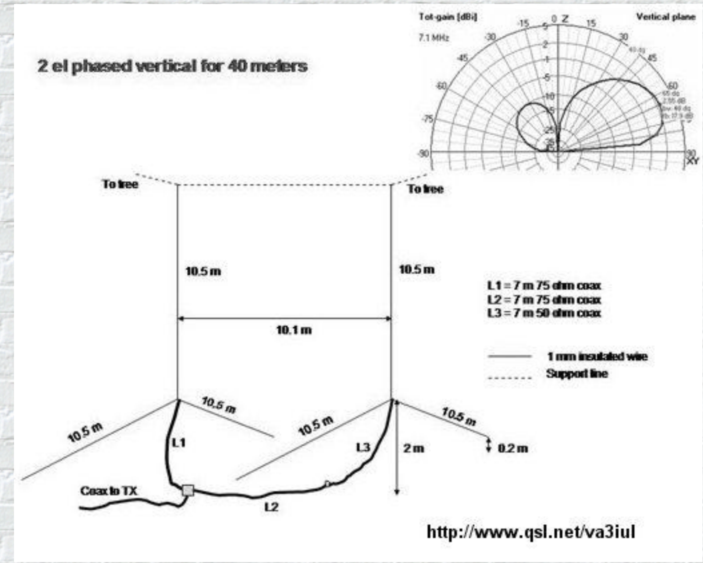
287 - Two Elements Phased Vertical Antenna 3dB-Gain for 40m



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The Radio Handbook - W. Orr (editor), 15th edition
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Jones Antenna Handbook - Frank C. Jones
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ARRL Handbook 1937-2009
ARRL Antenna Compendium
73 Magazine 1970-2002
Funkamateur Magazine 1990-2011
RSGB Handbook - 2007 - 2010
QST Magazine - 1980 - 2010
Ham Radio Magazine - 1969 - 1990
Radio-Electronics Magazine - 1986 - 1990

home: ***http://www.qsl.net/va3iul***

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